

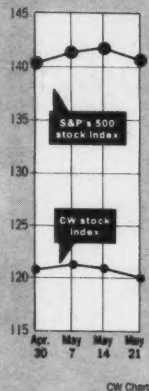
COMPUTERWORLD

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Stock update



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Mirroring IBM's relationship with Rolm, Wang Laboratories moves to acquire PBX manufacturer Intecom. Page 146.

Sperry customers may be placing purchase orders on hold in light of the continuing merger stalemate with Burroughs. Page 2.

IBM's RT PC has yet to find its way into corporate use, but software developers believe it may become a mainstream product. Page 6.

Hardware vendors release software standards for implementations of the Pick operating system. Page 15.

NCR Comten unveils a communications processor with three times the processing power of IBM's 3725. Page 37.

Javelin Software is the latest vendor to offer a corporate licensing program. Page 27.

Rear Adm. Grace Hopper, co-developer of Cobol and the woman responsible for standardizing computer languages and procedures throughout the U.S. military, is being forcibly retired by the Navy at the end of August. Hopper, 79, one of the computer world's most valuable players since before World War II, officially retired from the Navy Reserve in 1967. However, by Act of Congress, she has been recalled to active duty on a year-to-year basis ever since. Now, says Hopper's aide Lt. Brenda Sullivan, "The recall is not being renewed. The retirement was not by [Hopper's] choice." Hopper indicates that she already has lined up an unspecified postretirement job.

Citicorp officially tenders its expected \$675 million offer for Quotron Systems, Inc., the Los Angeles-based provider of on-line stock quote information. It was unclear at press time on Friday whether Quotron officers would continue to oppose the bid. Citicorp is offering \$19

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DEC E-mail an OSI first

Implements X.400 model for networking products

By Elisabeth Horwitt

LITTLETON, Mass. — Digital Equipment Corp. last week became the first computer company to offer users a complete set of commercial networking products conforming to all seven layers of the Open Systems Interconnect standard.

The breakthrough came with DEC's announcement of an electronic mail package that enables users to generate messages on a DEC proprietary editing or E-mail system and then transmit the message to a remote VAX or Microvax system.

The DEC package, called the Message Router X.400 Gateway Version 1.0, is the

See DEC page 6

User apathy faces Unix V.3

By Eddy Goldberg

Two weeks before AT&T is to unveil its long-awaited Unix System V update, evidence indicates that corporate computer managers see no compelling reason to switch to Unix.

The new Unix version, called Release 3, is due from AT&T Information Systems early next month, company sources say. It is intended to address businesses' growing need to share files transparently across a multivendor network through AT&T's addition of the Streams networking and Remote File Sharing features.

"We want to provide a network-based

See USER page 7

IBM unveils low-end SNA connectivity

By Elisabeth Horwitt

RYE BROOK, N.Y. — IBM last week greatly extended connectivity within its product line by introducing a low-end communications processor and a centralized network management system that oversees a broad range of IBM networking devices.

The developments will provide cost-effective implementation of Systems Network Architecture functionality at small remote sites and on IBM's Token-Ring network.

According to a principal developer of the products, last week's announcement reinforces IBM's commitment to become a complete communications supplier. With the new products, said Chris Harlaut of

See SNA page 8

VM networks get MVS communications features

By Charles Babcock

Advanced networking and addressing features of IBM's Systems Network Architecture were made available under the VM operating system last week. The features, which allow users of VM to create larger networks, were previously available only with IBM's transaction-oriented MVS operating system.

"IBM has finally gotten VM up to snuff with other communications products," said one DP executive who had begun to reach the former network address limits of VM.

Specifically, last week's releases affect use of extended network addressing and SNA Network Interchange on SNA net-

See VM page 4

CW EXCLUSIVE

Shape up: Industrial designers have profound MIS impact

By Clinton Wilder

They talk about behavioral sciences, urethane foam models and "the postmodern aesthetic genre." They never make sales visits or service calls, yet they are intimately associated with the daily lives of every computer user.

They are industrial designers, members of a computer industry subculture that determines product details from the lettering of error messages to the shapes of circuit boards.

Industrial designers' impact goes far beyond pure aesthetics. Design subtleties such as keyboard shape and monitor mobility can affect a very critical part of every information systems manager's

professional life: worker productivity.

"Product design is not an ephemeral thing. It determines how users do their work," says Paul Benigni, manager of Digital Equipment Corp.'s design group, which includes industrial design, graphic design and human factors engineering.

Benigni is one of the more innovative pioneers in the field, having started at DEC 10 years ago when, he says, "computers were nothing but big boxes with very few people using them. Now it's not good enough to put in a shiny metal box and have people be in awe of it. Physically, we began to soften

the forms."

Approaches to product design vary widely across the industry, and many vendors contract with independent design firms or consultants to handle the job. But companies with in-house design teams say they firmly believe that interaction during product planning among designers, electrical and mechanical engineers and marketing representatives is critical to a product's success in the marketplace.

"Determining the right design may be qualitative, but it's not something that can be judged by just one

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DEC's Benigni

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NEWSPAPER

NEWS

Sperry rejects Burroughs bid; takeover attempt turns hostile

Group of Sperry users plea for consideration

By Alan Alper

NEW YORK — Burroughs Corp., spurned in its sweetened \$75-a-share proposal to acquire Sperry Corp., last week reverted to a hostile \$70-a-share tender offer to take over its mainframe rival.

The events last week may lead to a protracted struggle for control of the company. The dispute is already causing Sperry customers to postpone orders, according to observers.

Meanwhile, a group of 17 Sperry users in the New England area last week sent a letter to Burroughs Chairman W. Michael Blumenthal and Sperry Chairman Gerald G. Probst requesting that the value of their investment in Sperry equipment be protected during the merger discussions.

May hurt both firms

"We think the merger is going to hurt both companies," noted group chair Elaine Massa, manager of technical services at Connecticut Natural Gas. "We think it's done a lot of damage already."

Of the 40 people in attendance at the group's meeting last week, none felt the merger would benefit Sperry users, Massa said. "We hope Sperry can get out of this," she said. "The firm has so much going for it right now."

By not responding to Burroughs' \$75-a-share offer by 5 p.m. last Wednesday, Sperry set into motion a series of events that would enable Sperry shareholders to sell their shares to the Detroit company at \$70 a share or wait until Sperry's conditional self-tender offer kicks in at \$80 a share.

Sperry's self-tender, however, becomes effective only if Burroughs is successful in purchasing 33 million of Sperry's shares, a move that would give it a 51% stake in the company. Burroughs would then seek to acquire the remaining outstanding Sperry shares by exchanging them for preferred stock and debt securities valued at \$70 a share.

Burroughs' offer expires on June 5 but can be withdrawn at any time until this Thursday.

"Sperry is trying to utilize every mechanism to avert making the deal, consistent with the board of directors' concern to maximize shareholder value," noted Michael Geran of E. F. Hutton & Co. "They're still working through the options available to remain independent."

The drawn-out takeover fight — while benefiting Sperry shareholders — the majority of whom are institutional investors and arbitrageurs — is causing Sperry customers to postpone orders, Geran said. "If you're an 1100/90 user, would you want to give Sperry \$5 million for another

system right now?" he asked. "The only ones having fun are the arbitrageurs."

Massa agreed that the merger discussions have caused some Sperry customers to postpone orders. "We have an 1100/90 on order. There is some question whether it would be a smart move, given what's going on, to go ahead with it," she said.

The group, which according to Massa recently petitioned the Sperry users group USE to be recognized as the New England Chapter, requested the following if a Burroughs-Sperry merger becomes a reality:

- Continuation of the research and development effort in conjunction with Sperry's product line.
- Continuation of current levels of system and software support.
- Continued assurance of upward compatibility of users' hardware.
- Assurance that major applications software systems and facilities such as Mapper and Unis are maintained.

”

"We think the merger is going to hurt both companies. We think it's done a lot of damage already. ... We hope Sperry can get out of this."

— Elaine Massa
Connecticut Natural Gas

share. According to Sperry, it entered into negotiations on the understanding the Detroit firm was willing to negotiate a price "north of \$75" a share.

'Evidence of bad faith

"Sperry believes Burroughs' new proposal of \$75 for the cash portion and securities of uncertain value for the second step violates the explicit understanding upon which Sperry commenced negotiations and is evidence of bad faith," Sperry said. "Sperry remains committed to pursuing appropriate options to enhance shareholder value," the company said in a statement.

Burroughs responded by saying it was "mystified" by Sperry's rejection of its \$75-a-share offer since that "is higher than the value the Sperry board placed on Sperry" in its self-tender offer for \$29.5 million shares. Burroughs declined further comment.

Meanwhile, a shareholder filed suit against Sperry in Delaware Chancery Court, charging that the firm's directors have breached their fiduciary duties and obstructed merger talks with Burroughs. The suit seeks to be recognized as a class action.

CORRECTIONS

The photographs accompanying the question-and-answer story with IBM's William Lowe [CW, May 19] were taken by Maxine Usdan.

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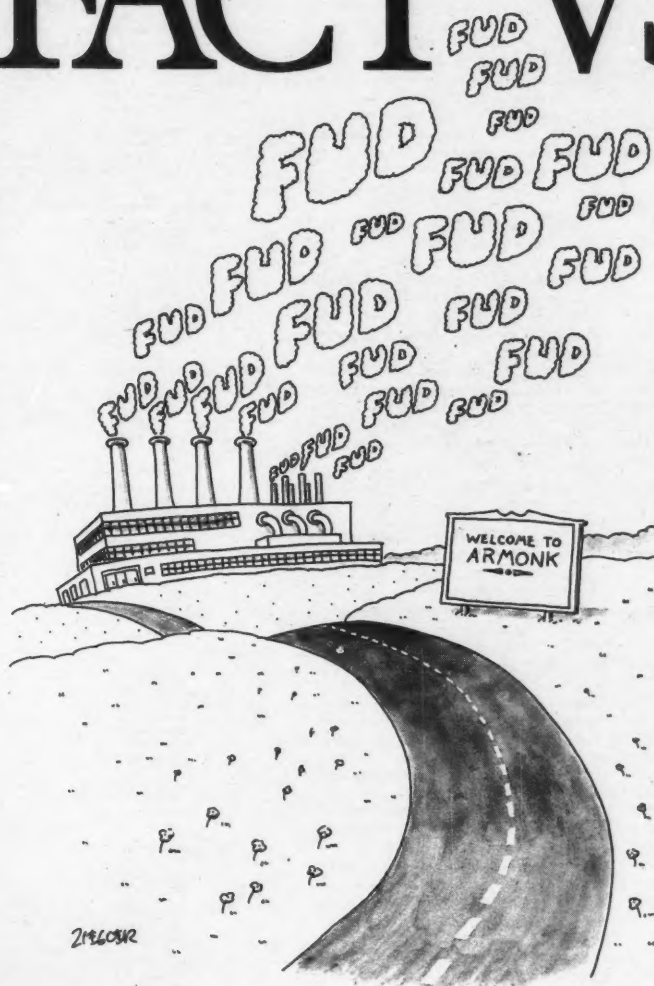
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NEWS

AT&T cuts rates an additional \$450 million

Slash comes on heels of \$1.5 billion reduction

By Rosemary Hamilton

WASHINGTON, D.C. — So as not to exceed the allowable rate of return dictated by the Federal Communications Commission, AT&T proposed \$450 million in price cuts last week in addition to the \$1.5 billion in reductions it announced late last month.

The price cuts AT&T proposed April 24 were to reflect the lower costs it would incur from the proposed rate reductions in local access charges that go into effect June 1. However, on May 14, the National Exchange Carrier Association (NECA) proposed an even lower access charge. Based on that revision, AT&T would have been earning more than the allowable rate of 12.75%,

even with the \$1.5 billion in reductions it proposed, according to an AT&T spokesman.

Upon receiving the revised proposal from NECA, the FCC requested that AT&T revise its rate reductions to reflect that change or provide justification for not doing so. At press time, the FCC had not yet reviewed last week's proposal from AT&T and therefore could not comment, a spokeswoman said. The price reductions are scheduled to go into effect June 1.

"This is going to put the squeeze on other long-distance vendors," said Michael Killen, president of Strategic, Inc., a market research firm in Santa Clara, Calif. "MCI has already announced it will cut its rates. It's great for businesses and consumers. An average of 10% is a lot of money."

As of last week's proposal, the rate reductions are as follows: AT&T

Long Distance Service is decreased by 13.8% for day and evening hours and 5% for late night and weekend hours. AT&T WATS service will cost 15.2% less. AT&T 800 service will be cut by 12.2%. Its Megacom service rates are lowered by an average of 15.1%. On average, the price cuts are 2.5% greater than the April 24 reductions.

Rates for the AT&T Software Defined Network service were also reduced. Earlier, the vendor said the service would be cut by 10%. According to James Brynes, an AT&T spokesman, the April 24 reduction was actually 6.6% and had been revised to 6.8%.

Brynes also claimed it would not be worth exceeding the allowable rate of return because "it would mean administrative turmoil and costs because we'd have to give rebates to our customers."

that making ACF/VTAM Release 1.1 available was a sign of IBM's commitment to VM.

"There is a relatively small number of installations with problems solved by ACF/VTAM Release 1.1," said W. Romney White, president of VM/CMS Unlimited, a consulting firm in Dorchester, Mass. But the announcement of the new release is a hopeful sign "that VM appears to be a full partner with MVS," he added.

"It's pretty important to us, because it allows us to grow our network any way we want to," according to a corporate DP manager who requested anonymity. His company was running up against the VM network address limit of 4,000 terminals per domain. "We were going to have to do something by the beginning of next year," he said.

Treat VM as a major product

The new release is less useful to a corporate client such as J. C. Penney Co. of New York, which operates a nationwide retailing network, because it already uses extended addressing and SNI under MVS. But William D. Friel, vice-president and director of systems and data processing, said IBM had "no choice but to treat VM as a major product. There is a strong customer base for it."

In addition to extended addressing

and SNI, IBM included a number of enhancements for systems operators.

By using a new Display command, an operator can view the specifications with which a device was added to the network when he is having problems with that device. Previously, he was compelled to go to the Network Control Program generation statement and find the logical unit name, line speed and other characteristics or read through a VTAM dump, according to William E. Warner, IBM's manager of network management products at the Communication Products Division in Raleigh, N.C.

Through a new Force command, an operator can force the shutdown of a device on the network then restart, rather than have a terminal sit locked up while operators search for the problem, Warner said.

IBM also announced Attachment 370+, which permits communications and device support between a host and an IBM Personal Computer AT, 3270 Personal Computer and 3270-PC AT. The program provides access to the information, functions and facilities of the host, including file transfer, execution of host procedures and virtual disk.

Attachment 370+ comes with two interfaces — the Personal Decision Series interface and the Extend/370 interface for experienced users.

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VM nets get MVS features

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works running under VM. Extended network addressing expands the number of logical units that can be included on an SNA network from 64,000 to more than eight million. SNI allows multiple SNA networks to be linked together, according to IBM spokesmen.

The new VM networking capabilities are the result of Advanced Communications Function for VTAM (ACF/VTAM) Version 3 Release 1.1, announced last Tuesday. Prior to Release 1.1, MVS had to be installed as a guest under VM in order for users to take advantage of the MVS networking features.

Sign of commitment to VM

Some large VM users said they liked the new VTAM capability, while others said they will continue to use MVS as their network operating system, running VM as a separate system alongside it. VM traditionally has been used more for program development than for transaction-oriented networks. All agreed, however,

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NEWS

Software lag holds up RT PC use

Developers see broader market, dramatic boosts

By Douglas Barney

The IBM RT Personal Computer, a technical workstation announced in January, so far has few users, due to the current dearth of software and a slow rate of shipment from IBM, users and analysts say.

Developers, however, expect dramatic RT PC performance boosts and an increasing acceptance of the RT for multiuser office applications to spur sales.

Computer dealers report that initial orders have come largely from developers interested in porting or writing software for the RT and from hardware and peripherals manufacturers. Volume shipments to dealers have only recently begun, and many dealers have still not received shipments.

Although software and the RT itself are said to be on the way, with most software packages set to ship this summer, corporations are reluctant to buy.

"We have not even thought about it because of the lack of software and not wanting to be on the leading, or bleeding, edge of technology," says Gregory Enders, information center specialist, Williams International Corp. of Wall Lake, Mich.

Williams' engineering staff of approximately 150 people currently uses Computervision Corp.'s CPG 200X for computer-aided design and manufacturing (CAD/CAM) and a couple of Harris Corp. minicomputers. "Our engineers are just now thinking about PCs, but I haven't heard one pop up and say 'RT PC' to me yet," Enders says.

Despite the machine's slow start, and what developers refer to as minor performance problems, the RT may prove to be a highly popular product. IBM says the market for the eight-user RT is more than three million technical professionals in the U.S., and many software developers concur. The market, however, could go beyond technical professionals, and the machine may well become entrenched in the mainstream business market.

For example, at the time of the RT's introduction, three office packages were announced — Solomon III accounting software from TLB, Inc.; office automation software from Applix, Inc.; and Samna+, an integrated word processing and spreadsheet package from Samna Corp. that is one of the few already shipping, according to Samna

President Said Mohammadioun. In addition, a decision support package from Comshare, Inc. targets both technical and business professionals. Many of these packages will be marketed by IBM.

Developers believe the RT will become a mainstream product. "I think the RT could be quite a fast office machine, although it is not positioned that way by IBM," according to Michael Laing, general manager of the Americas division of Moldflow Pty. Ltd., a supplier of computer-aided engineering software and services for plastics and metal components. He said the machine can do double duty by performing office functions and engineering or design functions simultaneously.

"The fact that it runs Unix, has the IBM label on it and can run DOS if you want

chine, the more real memory you have, the better it goes," Applix's Goschalk says.

Part of users' reluctance may be due to IBM's marketing. "I think it could be marketed a lot more aggressively," Samna's Mohammadioun says.

According to an IBM spokesperson, 12 third-party developers have completed packages, another 16 are close to completion, and 10 to 15 other vendors have begun work on packages. Another 7 packages are co-labeled and marketed by IBM under its vendor logo program, and three packages are privately labeled by IBM.

CAD/CAM tools unavailable

The major holdup has been in CAD/CAM software, the machine's hottest application. "None of the CAD/CAM software is available until September, so a lot of people haven't purchased the RT yet," says Vicki J. Brown, a senior research analyst in the computer-integrated manufacturing service for International Data Corp. Noting that IBM is only just beginning to ship in production volumes, Brown believes that "1986 may not be a good year for the RT, but certainly in 1987 you will start to see it take off."

"I am projecting that over 1986, 10,000 of these boxes will be shipped, but under the current circumstances that might be an optimistic prediction. About 60% will go to the CAD/CAM segment," Brown adds. The Yankee Group estimates that 18,000 RTs will ship this year.

Some developers are committed to the RT because they believe that IBM will continually enhance the product and thus expand its market. "I think we have bought in to the beginning of a family that is going to have a relatively long life. As our software develops and becomes more compute intensive, I think we can count on the RT staying ahead of our desire to consume CPU cycles," Laing says. Frank King, IBM's group director for advanced engineering system development, stated last February that the RT's performance would be doubled roughly every year.

There is another, perhaps even more compelling reason to port software to the RT. "If you are in the workstation marketplace and IBM is doing a workstation, you don't ignore it," Goschalk says.

Yankee Group's Charles Russell agrees. "They are in it because IBM is in it. It wouldn't matter if IBM sent out a pair of roller skates with IBM on it, they would write something for it."

"We are pretty well convinced that we are just at the beginning with the RT."

— Michael Laing
Moldflow Pty. Ltd.

it to make it a very attractive package," says Anthony M. Goschalk, director of marketing for Applix. "There is clearly some attempt from some part of the IBM organization that says there is more potential for this machine than just an engineering workstation."

Some users are holding off, due to questions about the RT's performance advantages. "They must improve performance and cost performance, as well as provide the ability to do the functions that we are doing today, before we will be interested," says a manager of engineers for a Fortune 100 manufacturing corporation who asked not to be named.

But developers believe that increased performance is already on the way. "We are pretty well convinced that we are just at the beginning with the RT. There are a number of enhancements which will be useful to us coming down the pike," says Moldflow's Laing.

Another shortcoming is the limitation of the machine's multiuser capability. Although IBM bills the RT as an eight-user system, most developers recommend putting fewer users on the machine. "From our perspective, the biggest constraint on the RT running eight users is the fact that there are only 4M bytes of real memory, and on any virtual memory ma-

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per share, the same price Quotron rejected last month as inadequate, but Quotron has been unable to find another corporate suitor since then.

At a London conference on graphics software systems earlier this month, Microsoft Chairman Bill Gates hedged his previous statement that a version of MS-DOS that breaks the 640K-byte random-access memory barrier would be ready by the end of 1987. "I have said that, but I'm on shaky ground," Gates said.

The computer-industry trade-show glut claimed another victim last week as the Interface Group cashed in its sparsely attended Comdex/Winter exposition. The 3-year-old show, held in March in Los Angeles, had disappointed show sponsors with poor turnout

of attendees and exhibitors.

An alternative to the IBM System/36 is reportedly due this week from Decision Data Computer Corp., a supplier of peripherals and software. The company claims the Decision36 will be targeted at small and mid-size businesses.

Northern Telecom will announce today major upgrades to its newest line of Meridian PBXs. The new options are said to quadruple the speed of the PBX systems, while doubling their main memory capacity.

Reliable sources say that both Rolm Corp. and AT&T will stage the long-awaited announcements of their low-end digital PBX systems at next week's International Communications Association conference in Atlanta.

DEC E-mail an OSI first

From page 1

first commercial software product to implement the X.400 message-handling protocol, one implementation of the seventh layer of the OSI networking model proposed by the International Standards Organization.

As DEC now becomes the only vendor offering an X.400 product, only Microvax and VAX users may use the Message Router. However, according to DEC spokesman David Korf, the new product will allow users to communicate with future X.400-compatible products from other vendors.

"Other companies already are demonstrating prototypes for X.400 software, especially in Europe," Korf said. He added that companies working on the X.12 file formatting standard have expressed support for X.400 as a document transfer and routing standard. At the recent MAP/TOP Users' Group Meeting, members of the Technical Office Protocol subcommittee reported that they were discussing X.400 implementation in TOP.

"All of the major computer vendors will have X.400 products within the next three to six months," said David Terrie, president of Boston-based Newport Consulting. Terrie gave DEC "technical straight As" for being first with an X.400 product. "It's a good strategic move. DEC can be an effective catalyst for industry adoption of the OSI model, providing a backbone that

anyone supporting OSI can talk to."

Terrie called OSI "DEC's weapon against IBM. Everyone is building gateways to SNA," he noted. The emergence of real OSI products will "shift the industry's center of gravity" by allowing multivendor systems to communicate with one another without having to go to IBM's Systems Network Architecture (SNA), he added.

'Rich functionality'

He pointed out, however, that it will be several years before OSI protocols will have the "rich functionality of DEC or IBM's proprietary networking protocols. For example, DEC's directory management is far more advanced." Right now, OSI does provide "basic messaging connectivity," Terrie said.

DEC's announcement is significant because the new X.400 will "play with all the other DEC OSI layers," including the recently announced VAX OSI Transport Service (VOTS) and VAX Packetnet System Interface, according to company spokesman Korf.

VOTS is DEC's implementation of the OSI Transport layer. Packetnet implements the most recent CCITT specifications for X.25 packet-switched networking. Another OSI portion out from DEC last week is VAX OSI Applications Kernel Software Version 1.0, which conforms to the OSI session layer.

Message Router X.400 will be available in quantity in July. Prices start at \$6,240 for the VAX, with the VAX 8800 version costing \$8,000. The Microvax version costs \$2,400.

NEWS

User apathy faces Unix V.3

From page 1

solution to communications-oriented problems, where the end user and application programmer are freed from worrying about whose network underlies the business solution they're dealing with," says Bill O'Shea, executive director of the Software Systems Division of AT&T Information Systems.

Nevertheless, the communications giant still must win over the hearts and minds of corporate users. "I'm still skeptical," says Bob Fredriksen, manager of planning and administration at GATX Corp., a diversified transportation and financial services company based in Chicago. "There's really not much there for us that we're not getting from our PCs," he says.

A recent survey of more than 250 Fortune 1,000 companies, conducted by Forrester Research, Inc. of Cambridge, Mass., showed fewer than one

stations and adds that its transportability will appeal to anyone interested in marketing applications.

Dave Moschella, an analyst at International Data Corp. in Framingham, Mass., says that although Unix has done well on mid-range systems and engineering workstations, it has made little progress at the mainframe or personal computer level. He expects this situation to continue into 1987.

"In commercial environments, Unix has trouble handling large data bases," Moschella says.

'Challenge of the late 1980s'

The Forrester report singled out the integration of personal computers as the "major information processing challenge of the late 1980s." As DOS pushes up against its memory limitations, and as multiuser comput-

ing and shared information processing continue to grow, the networking and file-sharing capabilities of Unix V.3 may be another reason for people to consider Unix as a solution.

"Unix V.3 is going to represent the best way of integrating personal computers," contends Gig Graham, executive vice-president of marketing and sales at Venturcom, Inc. of Cambridge, Mass. Venturcom developed and markets Venix, a System V derivative for processors from Intel Corp. and DEC.

"MS-DOS will always be on PCs, but PCs are getting bigger and faster. MS-DOS 5.0 will probably look more like Unix," Borgatta says.

Another problem area is security. "You don't want the systems programmer for the check processing program to have the same kind of access as the person who wrote the pro-

gram," Borgatta says. The Unix operating system is structured to be entirely accessible to the programmer. Operating systems such as IBM's MVS or DEC's VMS are partitioned to prevent this.

The federal government and AT&T's use of Unix as their operating system for commercial-type applications shows it is possible to add the necessary security to Unix. But this function is not yet well documented nor is it readily available from AT&T.

Unix is still young in terms of the commercial environment, she observes, and though she says she thinks the learning curve will flatten out in a few years, Unix will never replace MVS but will more likely be used for business on coming generations of personal computers and minicomputers.

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As DOS pushes up against its memory limitations, the networking and file-sharing capabilities of Unix V.3 may be another reason for people to consider Unix as a solution.

in four of the sites surveyed will implement Unix by the end of 1987. Of those sites using Unix today, "Most of the Unix implementations are pilot or are very limited," says Forrester President George F. Colony.

Further, nearly half the sites with Unix currently installed said they have it because "it came with the hardware."

"You'll see it more in manufacturing than in financial applications," says Lydia Borgatta, who heads up advanced workstation development at Bankers Trust Co. in New York. This trend was spotlighted in February when General Motors Corp. called for its suppliers to adopt AT&T's Unix System V or a certified equivalent as the standard operating environment for manufacturing systems [CW, April 28].

"We needed a standard operating system for transportability of application software," says John Williams, senior manufacturing project engineer and chairman of GM's Unix System Implementation Task Force. "We do not want to be tied to a single-vendor solution for hardware or software," he adds.

Williams presents an alternative to the perception that Unix is still best used in laboratories and universities. "We surveyed what was out there, and Unix seemed to have a ground swell," he says, citing its popularity in trade journals, its growth in application software and the IEEE moving toward a standard for Unix (IEEE Trial Use Standard 1003.1 was approved in March). He says he foresees increasing Unix use in office automation and on engineering work-



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NEWS

SNA gets connectivity

From page 1

IBM's LaGaude Laboratories in France, IBM is both extending its current communications product line and enhancing the connectivity of existing offerings "so our customers can install bigger networks more efficiently and cost effectively."

Users also saw the developments as having important implications for IBM's communications strategy. IBM's introduction of the 3720, a low-end member of the 3725 family of communications processors, was "the part of the announcement that I concentrated on," said Trav Waltrip, vice-president of data processing at Travelers Insurance Co., based in Hartford, Conn. "It represents IBM's statement of direction toward less expensive network gateways."

Along with 3270 Models 1, 2, 11 and 12, IBM announced several other communications products, including the following:

- **Netview network management package.** See related story this page.
- **Full-function Systems Network Architecture capabilities for its VM operating systems.** See story page one.
- **X.25 SNA Interconnection,** a software package that allows terminals using SNA to communicate over an X.25 packet-switched network without going through a host.
- **IBM 5821 Digital Service Unit/Channel Service Unit Model 10,** an interface between IBM systems and AT&T's Digital Data Service lines.

The 3720 benefits IBM customers by "distributing SNA functionality into the ranks of smaller offices," said Paul Kirvan, a principal of Turnersville, N.J., consult-

ing company Paul F. Kirvan & Associates. The 3720 would replace cluster controllers at remote sites, he added, noting, "You can't implement sophisticated SNA network management features on a cluster controller."

"Introducing a low-cost communications controller helps shore up IBM's weak mid-range system line, which Wang Laboratories, Inc., Digital Equipment Corp. and Data General Corp. are competing against, by putting their own mid-range systems in between IBM PCs and mainframes," commented Marty Gruhn, a vice-president at Tempe, Ariz., consulting company Sierra Group.

"I think shrinking the size of the 3720 and having it support the Token-Ring will

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"I think shrinking the size of the 3720 and having it support the Token-Ring will be very useful to us."

— Trav Waltrip
Travelers Insurance Co.

be very useful to us," Waltrip said. Travelers has 19 IBM 3081 hosts and has already installed more than two million feet of IBM Cabling System wiring for a series of Token-Ring networks that will eventually support some 9,800 terminals, he added. The 3720 will provide a gateway from Token-Rings at remote sites back to hosts at Travelers' headquarters, Waltrip said. "It could have been done with 3725s, but they clearly are expensive boxes that can't be installed at all our remote sites."

The 3720 supports up to four mainframe hosts and is said to offer approximately one-third the throughput performance of a 3275. The 3720 Models 2 and 12 were

designed to operate in a remote environment and can be controlled from a central site via a remote console interface. The 3720 Models 1 and 2, which support up to 28 lines, are scheduled to be available by October this year. The 3720 Models 11 and 12, which support two Token-Rings and up to 16 lines, are scheduled to be available by July 1987. The 3720 series prices start at \$26,000. The new IBM 3721 Expansion Unit, which enables a 3720 to support an additional 32 lines, is priced at \$16,000 with one scanner and is scheduled to ship in October.

Waltrip also expressed interest in the newly announced 3725 Communication Controller Enhancements, which expand the controller's main memory from 2M to 3M bytes and increase the number of 56K or 64K bit/sec. lines per scanner from two to four. "They will allow us to put more telecommunications lines on a 3725, which will help me reduce the total number of 3725s I have," he explained. The 3M-byte storage capability is priced at \$2,700, with availability scheduled for October of this year.

IBM expanded its X.25 support with two software products, X.25 SNA Interconnection (XI) PRPQ 7L1000 and X.25 SNA Network Supervisory Function PRPQ 7L1001 (NSF). The two offerings can either be installed on their own or complement Network Control Program Packet Switching Interface, IBM's current X.25 network offerings, Harlaut said. Available first-quarter 1987, XI enables both SNA and non-SNA terminals to communicate over an X.25 network through a communications controller rather than through a mainframe host. NSF, installed in the controller that handles SNA-to-X.25 networking, collects and records accounting data for traffic handled by XI.

The IBM 5821 Data Service Unit/Channel Service Unit Model 10, also announced last week, transmits at up to 56K bit/sec. over Digital Data Service lines. It also can be used over private, twisted-pair, four-wire networks. Scheduled to ship in July, the 5821 is priced at \$850.

The Data Service Unit and enhanced X.25 support reflect IBM's acknowledgment that "the real world is not all blue" and a determination to sell users total networking solutions, including connections to non-IBM systems, Kirvan said.

Gruhn added: "Our overall sense is that IBM is really reacting to DEC's increasing dominance in the networking arena. To put it bluntly, DEC is breathing down IBM's neck."

IBM's Netview links five network packages

Global manager handles SNA nets

IBM last week packaged and enhanced five network management offerings into one global management system. Netview, IBM's new network management product for Systems Network Architecture (SNA) networks, offers in one integrated package the functions of several existing IBM network management offerings:

- **Network Communications Control Facility.**
- **Network Logical Data Manager.**
- **Network Problem Determination Application.**
- **VTAM Node Control Application.**
- **Network Management Productivity Facility.**

Netview "allows our customers to buy one network management product instead of five, and we've also added enhancements to improve the network operator's productivity, thus reducing the cost of his job," said William Warner, IBM manager of network management products.

Through the Netview Status Monitor, the operator can access data on different segments of the network or obtain an overview of all network resources at once.

'Good news'

"IBM's packaging individual network management pieces into a global network manager within VTAM is good news for us," commented Trav Waltrip, vice-president of data processing at Travelers Insurance Co. in Hartford, Conn. "Previously, we had to build an application to link those pieces together to give us overall network management. IBM is saying, 'We have an overall management strategy for both local and wide-area networking.'"

Paul Kirvan, principal of Turnersville, N.J., consulting company Paul F. Kirvan & Associates, called Netview "the most significant of IBM's new products. In the past IBM has not been renowned for network management," he added. "This seems like a major step in developing a product that manages all the major areas of networking."

"Netview's support of the Token-Ring is especially important," Kirvan explained, "indicating that IBM is bringing all of its major communications products into the system."

He predicted a future IBM announcement of Netview support for System/36 and 38, "because they are key el-

ements of the IBM network picture."

Netview interfaces

IBM is making documentation on Netview architecture available to third-party vendors so that they can write interfaces to the system, Warner said. "We recognize that customers have a lot of network equipment that is not IBM's." Netview's architecture also allows for network diagnostic information to be sent to other network management systems, Warner added. "But IBM wants to provide end-to-end telecommunications network management."

"I suspect that Codex, Infotron, General Datacomm and the other network equipment vendors will soon be announcing compatibility with Netview," Kirvan said.

Netview enhancements include more than 1,500 Help panels and tutorials, a Help desk facility, a status monitor facility, the consistent use of color and function keys in the user interface and a mechanism to enable the operator to move easily from one network management function to another, Warner said.

Netview links

IBM also announced links between Netview and several of its currently available communications devices. Diagnostic and monitoring data collected by the Token-Ring Network Manager, a set of network diagnostic tools announced by IBM last month [CW, April 21], can be sent to Netview for further analysis.

The 3728 Matrix Switch Host Facility, which IBM also announced last week, allows a centralized network management program to configure and monitor functions performed by the 3728 Matrix Switch. The facility will ship in November.

Netview also can access enhanced functions provided on the new IBM 5865, 5866, 5868 modem series, enabling it to retrieve and update remote modem configuration data, trigger through a modem a remote function and gather line analysis and transmit and receive test results from modems.

Netview operates in SNA Advanced Communications Function for VTAM network environments. Monthly licenses are priced at \$1,255 for the MVS/XA version, \$1,060 for MVS/370 and \$940 for VM. MVS versions of Netview are scheduled to be available in fourth-quarter 1986, and VM versions should be available in first-quarter 1987.

— Elisabeth Horwitt

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PDSFAST	48 sec.	.7 sec.	122	\$1.75
47 cyl. PDS Unload to Tape				
lebcopy	58 min.	14 min. 52 sec.	97,253	\$92.05
PDSFAST	4 min. 3 sec.	37 sec.	911	\$5.74
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NEWS

Southern Bell signs up first ISDN customers

Plans to provide transition service until 1988 rollout

By James A. Martin

ATLANTA — Southern Bell Telephone and Telegraph Co. announced last week that Trust Company Bank of Georgia and Prime Computer, Inc. have signed up to be the first customers of the utility's Integrated Services Digital Network (ISDN), scheduled to be in-

troduced in early 1988.

In the interim, the company said it will begin offering in early 1987 "transitional ISDN access technology," a digital network service that provides dedicated voice and data communications simultaneously over a single telephone line. ISDN will use virtual digital lines, a more cost-effective alternative whereby different customers share lines.

Because of the increased competition resulting from interstate banking, Trust Co. decided "if we were going to

stay on top, we needed to be provide better services," said Tommy Vaughn, vice-president and communications manager of Suntrust Services, a subsidiary formed by the recent merger between Trust Company and Sun Banks of Florida, Inc., in Orlando, Fla.

"Bankers ought not to have to deal with modems when they ought to be making loans," Vaughn said, pointing out that using digital services would not require modems. "ISDN will provide the flexibility we need. With all the networking we do across the spectrum of vendors, ISDN can let us go in and plug in and not have to make a lot of software changes."

Initial costs high

Although initial implementation costs are expected to be high, Vaughn said ISDN will allow the bank to take advantage of such services as video conferencing, which is now too costly.

Trust Company will use 50 basic ISDN lines in branch offices now under construction in suburban Atlanta. Trust Company presently operates five separate networks, including those with specific applications for automatic teller machines and the bond department, and expects ISDN will replace portions of those networks and interface with the remainder.

Prime Computer will be equipped with 25 basic ISDN lines and one primary line in its existing branch office in suburban Sandy Springs, Ga. The basic lines provide two B channels, which carry digital voice or data transmissions at 64K bit/sec., and one D channel, which carries signaling. The primary line will provide 23 B channels and one D channel.

Tying worldwide operations

Prime's Atlanta sales and service office "relies heavily on data communications to enhance our system offerings," said Jim FitzGerald, product manager of ISDN Development for Prime. "Our customers are spread all over the globe, and there is concern and a great need to tie together the worldwide operations with a single topology. ISDN appears to be that topology."

Many of Prime's customers are interested in ISDN technology as well, FitzGerald added. "Banking, brokerage and manufacturing firms will be using ISDN for transaction processing and data base retrievals. Our scientific and engineering customers also want ISDN because it affords high terminal connectivity, security features and high data rates."

Atlanta will be Prime's first venture into ISDN implementation and will provide both local- and wide-area network access to users in the office, according to FitzGerald.

At present, Prime's Atlanta office operates on three Prime superminicomputers tied into the corporate network via Telenet X.25 packet-switching connections.

ISDN will provide the means by which users in the Atlanta office can directly dial up corporate mainframes in Prime's Natick, Mass., office, allowing for more efficient and flexible connections, FitzGerald said.

Tariffs for ISDN services have not been determined, according to Southern Bell officials.

Also last week, Bell South Corp., the holding company for Southern Bell, said it has developed a "dedicated transitional digital facility to ISDN," described as a "three-channel digital multiplexer for a simultaneous digital voice and data communication system."

The system will provide a voice channel for analog telephone and/or analog data services, a medium data channel for any standard 300 to 19,200 bit/sec. asynchronous or synchronous AT&T Digital Data Service and a low-speed data channel for any standard 300, 600 or 1,200 bit/sec. asynchronous data.

Datamedia to announce supermicros

By James Connolly

NASHUA, N.H. — Incorporating the Motorola, Inc. 68020 as a microprocessor, Datamedia Corp. is scheduled to introduce three additions to its DMC/932 family of 32-bit supermicrocomputers today.

The systems, supporting up to 32 users, were designed for use as distributed processors and departmental processors in medium-size or large organizations and as central processors in small companies.

While earlier models in the DMC/932 line used Motorola 68010 chips, the new models are based on a 16.7-MHz 68020 and an optional Motorola 68881 floating-point coprocessor. In addition, the mid-range DMC/932 Model 2620 and high-end DMC/932 Model 2640 include a 16K-byte dual set cache.

According to Datamedia, the Model 2620 running the U.S. Steel Corp. Cobol benchmark provides more than twice the power of the Digital Equipment Corp. Microvax II or the IBM 4341 Model 1 for \$22,500. The entry-level system, the DMC/932 Model 2610, costs \$18,500 and the Model 2640 costs \$28,500.

Datamedia is targeting the systems at IBM host DP environments with IBM Systems Network Architecture Synchronous Data Link Control, 2780/3780 and Bisynchronous 3270 emulation capabilities that reportedly allow remote connection to up to four hosts at speeds of up to 56K bit/sec. The systems allow Ethernet connections, multiuser windows and menus.

"We believe this application of industry standards, advanced microprocessor technology and networking capability will enable MIS/DP departments to take advantage of the cost-effectiveness of the latest technology while protecting their current investments in data processing and communications equipment," said Datamedia President Guy A. Daniello.

The systems, which run AT&T Unix System V Version 2, reportedly are upgradable from the Model 2610 through the Model 2640.

The base configurations include 2M bytes of memory, which can be expanded to 16M bytes. The systems also can be expanded to support 500M bytes of disk storage.

Based in Nashua, Datamedia is a private company that claimed sales of \$26 million in 1985. Their supermicros are distributed through a direct sales force, OEMs and systems houses.

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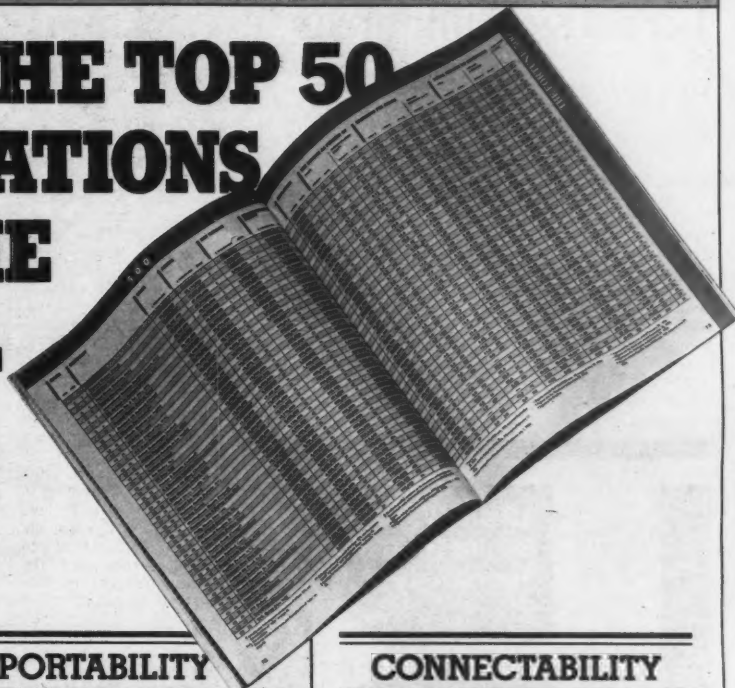
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NEWS

Business economists foresee more 1986 corporate spending

Rise in computer sales concurrent

By Mitch Betts

WASHINGTON, D.C. — Many U.S. business economists are becoming optimistic that corporate profits and investments will increase later this year and in 1987, a broad trend that might translate into more corporate spending for computer systems and a modest recovery for the computer industry.

The bullish economic as-

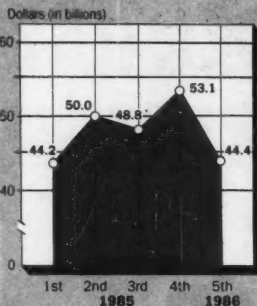
essment came from a survey of 330 members of the Cleveland-based National Association of Business Economists (NABE). The quarterly survey, released last week, predicted 5.5% growth in business investment, equipment and building this year and 5% growth in 1987.

The association's optimism for 1986 is not universally shared. McGraw-Hill, Inc.'s spring survey of capital spending plans indicated that spending by nonpetroleum industries will increase only 1.2% this year.

The first quarter of 1986 was clearly a bad one for computer sales in the U.S. Seasonally adjusted figures released last week by the U.S. Department of Commerce showed that domestic sales of office computing equipment dropped by \$8.7 billion (in constant 1982 dollars), or more than 16%, from the fourth quarter of 1985 to the first quarter of 1986.

However, several important economic indicators are suggesting a stronger economy in the second half of this year, according to a report by industry analysts at Alex Brown & Sons, based in Baltimore. "We believe an improved economic climate is critical to stronger order rates" for information systems, the analysts reported.

Office computers: Quarterly sales in the U.S.



Figures are based on 1982 dollars, seasonally adjusted.

Information provided by the U.S. Department of Commerce, Bureau of Economic Analysis

The NABE's increasing optimism about the U.S. economy was fueled by declining oil prices, a factor that reduces inflation and business costs, thus improving profit margins; according to Kathleen M. Cooper, NABE president and chief economist at Security Pacific National Bank in Los Angeles.

"We think capital spending will come back. The main reason that businesses aren't spending more than they are is uncertainty" over federal tax reform and the economy's future, she said.

Cooper said the predicted moderate growth in business spending and the declining value of the dollar will help the computer industry recover from its slump.

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WORLD DIGEST
Computerworld
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BRUSSELS — The European Community's (EC) Esprit technology research project will triple in size next year, if a recommendation made by the EC last week is accepted

by the 12 member nations.

The expanded second phase of the program would represent about 30,000 man-years of work, according to one EC official, and the new five-year budget could reach roughly \$4.6 billion.

TOKYO — Mitsubishi Electric Corp. Tuesday released an artificial intelligence workstation called the Melcom Psi that executes high-speed processing in the Prolog language.

Mitsubishi claims it has incorporated what analysts call a 4.5-generation computer — a sequential inference machine — developed by the Institute for New-Generation Computer Technology (ICOT), Japan's think-tank for fifth-generation computer research.

The language for the new workstation is the Extended Self-Contained Prolog (ESP), an AI language from the ICOT project. ESP is expected to enable program modularization.

TOKYO — In the first deal of its kind with a foreign vendor, Japan's Nippon Telegraph and Telephone Corp. (NTT) inked a \$250 million, five-year contract this week to purchase digitized telephone exchanges from Nashville-based Northern Telecom, Inc., beginning in 1989. Northern Telecom won the procurement deal over AT&T in a bidding battle that dates back to the summer of 1985.

For NTT, the pact with Northern Telecom was the largest supply contract with an overseas communications vendor since the leading Japanese common carrier opened its doors to foreign

procurement in 1981.

PARIS — IBM, the French bank Paribas and French computer services company Sema-Matra will probably begin work next month on the value-added network announced last February.

The decision by Paribas and Sema-Matra to launch a value-added service with the U.S. computer giant's French subsidiary drew considerable attention during French elections back in March.

All European telecommunications, with the exception of those in the UK, are controlled by state-run telecommunications authorities, which are often protective of their markets and uneasy about the penetration of foreign firms.

It appears now, however, that the network, which would be one of the first value-added services in Europe, will proceed.

SYDNEY, Australia — The Australian software industry could be dealt a stiff blow if a Copyright Law Review Committee yields to lobbyists' efforts seeking to diminish copyright protection, according to Australia's largest industry organization.

"The protection is absolutely paramount for the continuing development and expansion of the software industry. Software represents vital productivity tools for other industries and our access to these products at or near world prices affects our international competitiveness in these industries," an Australian Information Industry Association spokesman said.

See DIGEST page 15

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NEWS

Major players' absence hinders attempt to define 80386 bus

Microsoft, Compaq, IBM stay on sidelines

By Eric Bender

BOSTON — An attempt to define a standard bus for Intel Corp. 80386-based machines, which could accelerate commercial shipments of the next-generation systems, was formally disclosed last week by Phoenix Technologies Ltd. But the absence of public backing from IBM, Microsoft Corp. and Compaq Computer Corp. created considerable skepticism about its chances for success.

Phoenix, which supplies IBM Personal Computer-compatible systems technology that AT&T and many other OEMs have built into their micros, wants to create a standard hardware architecture for Intel's new 32-bit CPU that will allow vendors to create machines within three months.

Standardizing on a bus would nail down only one major hardware aspect of the new machines, leaving many software incompatibility issues unaddressed. But it would let peripheral suppliers begin developing products, thus encouraging system manufacturers to plunge ahead, according to Phoenix Chairman Neil Colvin. "There are many manufacturers today, sitting ready, wanting to introduce the 80386 into the marketplace," Colvin said. "But there's real fear of being odd man out."

Working group

As a first step, the Norwood, Mass., company brought together 44 systems and peripherals manufacturers a month ago at the Comdex/Spring show and established a working group with members from AT&T, Chips and Technologies, Emulex Corp., Olivetti Corp. and Tandy Corp. Scheduled to meet late last week, the working group aims to produce a draft standard for discussion next month during a gathering at the National Computer Conference.

While IBM's involvement "would be nice, I don't think the people attending the meeting at Comdex thought it was crucial," Colvin declared. The general industry consensus is that IBM will not introduce any 80386-based systems for at least nine months, he added, and other suppliers feel that "to sit back and wait... is to lose a major advantage."

However, Boston-based Yankee Group analyst Michael Goulde was among the skeptics about prospects for the standard effort. "The 386 will not be a low-end, work-at-home machine — a Tandy machine," Goulde said. "This will be a \$7,000 applications processor for corporate America... These vendors may set a standard, but corporate America votes on the standard, and corporate America votes for IBM."

IBM declined comment on the standardization effort and on any product schedules. A Microsoft spokesman remarked only on the problems facing those attempting to standardize desktop systems without the active cooperation of IBM and Microsoft. "Compaq is not involved in any way, and our view is that committees don't set industry standards, markets do," said Michael Swavely, Compaq marketing vice-president.

Despite Tandy's participation in

the Phoenix effort, Graham Beachum, vice-president for computer merchandising, downplayed near-term commercial expectations for systems built around the 80386: "We see the 80386 as a 1990-type event."

Late summer delivery

But Colvin, who said he has seen demonstrations of three prototype 80386-based systems, predicted that the first commercial systems will be delivered by late summer, with perhaps half a dozen by year's end.

He suggested, "On Day 1, they will look very much like turbo ATs" — systems running standard packages at greater speed, rather than software specially tailored for the 386.

In the long run, however, "very few of them will be PC clones in the sense that we think of PC clones today," Colvin said. With memory protection features built into the hardware, the 80386 can support multiple operating systems concurrently and independently.

Compaq's Swavely forecast that the 80386 machines initially will divide into two classes: extremely high-performance single-user machines and Unix systems. He would not hint at any Compaq plans, although he reiterated, "We don't feel we have to wait for IBM to do things before us... We didn't wait for IBM to say that an 8-MHz AT was okay."

"I think you will see 80386-based

product announcements as early as tomorrow," Swavely added. "Actual product availability may be something else. We'll start seeing first availability in the fourth quarter and volume availability in the late fourth or early first quarter."

Like many other vendors, Compaq does not expect IBM to lead the parade of computers powered by the Intel chip. "First, they've made a major investment in the next generation of PC-DOS, specifically related to 80286 architecture, so I don't think they're too anxious to move into a next-generation product," Swavely said. "Second, the 386 offers a level of performance comparable to many of IBM's mid-range products."

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Starting this issue, see page 125.

COMPUTERWORLD

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NEWS

Computer designers

From page 1

person," says Pete Simpson, a development engineer for Wyse Technology, Inc., a San Jose, Calif., terminal manufacturer. "Our design evaluation process represents a cross-section of the company. The product has to be not just what we like, but what we think corporate America wants."

Much of what the computer user wants is obvious and has been well documented: products that are ergonomi-

cally comfortable and easy to use.

But behind those basic concepts is an array of factors that industrial designers must grapple with in order to earn their salaries.

"Most of what is aesthetically pleasing or not are the subtleties of proportions — the radii of the terminal's corners, the balance of the colors," says Don Donatelli, manager of product design for Sun Microsystems, Inc., based in Mountain View, Calif.

"Most of that is below what we call the perception threshold. People won't know why the machine is shaped a certain way and

won't consciously be aware of it, but subconsciously, it refers back to the system. The user hasn't seen it before, but it seems familiar," he says.

Matching typefaces, keys

The keys on the Sun-3 engineering workstation, for example, use a serif typeface to match the typeface of the Unix operating system commands on the screen. The keyboard itself is a sculpted, concave design to reflect the shape of the keys.

"The dished keyboard has no real function, but it reflects the function of the keys," Donatelli says.

"It's a specific cultural comment back to the product line. The keyboard also has palm rests, which few people use, but make the keyboard look more comfortable aesthetically," he adds.

Architects of interfaces

Designers view themselves as the architects of every interface between user and machine. Those interfaces, especially in products from a large systems vendor like DEC, mean much more than a data entry clerk's fingers on a keyboard or eyes on a screen.

A high-end VAX supermini encased in sheet metal may not have the exterior design flexibility of a VDT housed in molded plastic. But DEC designers work, in the words of Industrial Design Manager Rich Johnson, "from the inside out." These people play a large part in

the layout of internal CPU boards, power supplies, cooling systems and cabling connections.

'More human interface'

"Even at the high end, there is more and more human interface inside the skins of the computers," says Bob Hanson, an industrial design supervisor in Johnson's group.

"The biggest challenge is merging all of the functional aspects — thermal, acoustic, cabling. The machine should look just as nice with the door open — like looking under the hood of a new Corvette. It looks like someone cared," he says.

For some hardware companies, such as those who make IBM-compatible termi-

trying to push the frontiers of design, to innovate and still appeal to a mass audience. But it still has to be manufacturable, and at low cost. You can't build a computer like a Ferrari, looking great and costing a fortune."

Multivendor sensitivity

When striving for a unique corporate product image, designers must also be sensitive to multivendor environments.

"Half of our business is OEM," says Sun Microsystems' Donatelli. "It's important to have an aesthetic that's not too specific so it can be used in conjunction with other systems."

Design factors can be critical in the world of IBM Personal Computer-compatible clones, where packaging and price are often the only factors distinguishing one vendor's products from another's.

"Our design goal is simplicity," says Ted Papajohn, industrial design manager for IBM-compatible market leader Compaq Computer Corp.

"Less detail means fewer specs, which means less production cost. Most important, you can't go into 21st-century designs and set yourself so far apart that you can't sell it. If you intimidate the user, you've automatically lost a sale," Papajohn says.

Design sets Compaq apart

But Compaq also sought a micro design that would set it apart from the company whose functionality it emulates: IBM. "We tried to avoid their color scheme, their forms and their configurations," Papajohn notes. "And we've tried to keep each of our products in a consistent context with the others."

Papajohn's bent toward consistency is echoed in Maynard, Mass., where DEC's "one company, one architecture" corporate message is the modus operandi of President Kenneth H. Olsen's minicomputer empire.

That philosophy touches all three design groups at DEC, but it touches graphic design most of all. From labeling a shipping box to developing an Arabic-language keyboard, the goal is product line continuity.

"There was a time when just about every DEC product looked different," says Charles Conn, who was hired as DEC's first graphics designer in 1978 and is now graphic design manager.

"Now it's important to maintain continuity in everything, even something as seemingly insignificant as a regulatory marking. We're responsible for corporate identity. Sales brochures and posters come and go, but products are the essence of the company," Conn says.

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"The machine should look just as nice with the door open — like looking under the hood of a new Corvette. It looks like someone cared."

— Bob Hanson
Digital Equipment Corp.

nals, product design is an essential component of differentiating a vendor from its competitors.

Design was neglected

Wyse executives, beginning with founder and President Bernard Tse, attribute much of the company's early success to design factors.

"The aspects of ergonomic and industrial design were neglected in this industry," Simpson says.

"Detached keyboards, for example, were unheard of eight years ago. Even in our very first products, we asked questions about who is using it, in what environment and what are his needs?"

Apple lessons

Steve Holtzman, Wyse's director of product marketing, is a former Apple Computer, Inc. marketing employee. He says that the limited corporate acceptance of many Apple products can be partially blamed on design.

"Steve Jobs used to say that we should design products for ourselves," Holtzman says, "and we developed products with small screens and a lack of cursor keys — features that the corporate community was not willing to accept."

Industrial designers often tread a thin line between a suitably creative and an overly radical design.

"The WY-50 terminal was very radical but was accepted in the marketplace," Holtzman says. "We're still

NEWS

Group sets Pick standards, hopes to increase compatibility

Produces SMA/Basic, magnetic media norms

By Maura McEnaney

SAN DIEGO, Calif. — The first set of software standards for hardware manufacturers implementing versions of Pick Systems' Pick operating system was released last week by the Spectrum Manufacturers Association (SMA).

The standards are an attempt by a group of 17 hardware manufacturers, systems integrators and OEMs that license the Pick operating system to promote the use of their Pick-based hardware. Although Pick is known for its Unix-like portability across a wide range of hardware systems, a variety of implementations have diluted systems compatibility, vendors admit.

The SMA standards include the implementation of SMA/Basic, an extended version of the existing Basic language as it has been used on the Pick system. SMA/Basic includes Basic programming language definitions for programming functions such as accessing file structures, accepting input information and preparing reports.

A second category is a magnetic media interchange standard that defines the way data is written onto 1/2-in. magnetic tape, 1/4-in. cartridge tape or a 5 1/4-in. floppy diskette. Under this standard, users will be able

to interchange compatible media between a variety of Pick-based systems. SMA vendors will have 18 months to conform to the standards. Standards on retrieval languages, terminal services and a third miscellaneous group are expected in about a month.

For Pick users like Larry Walton, data processing manager of Family Fitness Centers in San Diego, the emergence of Pick standards means he may one day be able to run the same application across his Pick-based hardware without having to spend time making several format changes.

Family Fitness Centers uses Pick with its Prime Computer, Inc. 450-II.

an Ultimate Corp. 3030 minicomputer, General Automation, Inc.'s Zebra 3750, 3500 and Zebra 2500 microcomputers and several IBM Personal Computer XTs to keep track of memberships at its 22 health clubs.

"The communication between these different computers has been very difficult," Walton notes. "The SMA standard is going to mean that I can port my applications more easily across these different systems."

Converting Pick applications from an Ultimate to a McDonnell-Douglas Computer Systems Co. machine may now take about three days, notes Gus Giobbi, president of the International Data Base Management Association, a for-profit organization for Pick users.

ers and the administrative arm of the SMA. But once the vendors implement the standards, users of new systems will be able to convert almost automatically, he said.

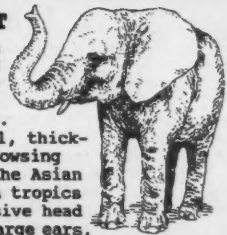
Chandru Murthi of Op Sys consultants in San Francisco says the emerging set of standards is one of the best things that has ever happened to the Pick community. "Until recently there has been a tremendous rivalry between Pick vendors to cut up pieces of the same pie. Now they are trying to make that pie bigger," he says. The SMA standards will not make current Pick systems obsolete but instead will give users more freedom to buy from different vendors, Murthi adds.

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DIGEST from page 12

 **LONDON** — UK Department of Trade and Industry (DTI) officials will hold an emergency meeting with U.S. counterparts to resolve the wrangle over a Cray Research, Inc. Cray 1 supercomputer ordered by the University of London Computer Center. The U.S. refused to issue an export license to ship the supercomputer until the university signed an agreement forbidding access to it by Eastern bloc and Chinese nationals.

But the university's computer center last week told the DTI that it could not restrict access to the computer and accused Washington of blackmail.



 **OSAKA, Japan** — Sanyo Electric Co., a latecomer to the Japanese compact disk (CD) market, has recently doubled CD manufacturing capacity to 10 million units a year, anticipating further build-up to 1.5 billion by this summer. Sanyo, which dove into CD in mid-1983, is also considering increasing the production of CD read-only memory devices.

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SEE PAGE
125

VIEWPOINT

EDITORIAL

Leading the charge

DP/MIS managers, haunted by memories of being bystanders rather than generals in the microcomputer revolution, like to believe they have taken to heart the battle cry, "Never again!" They are currently being handed an excellent opportunity to prove their mettle and the worth of their new role as corporate information systems managers.

The opportunity is presented by the emerging technology of in-house electronic publishing, examined at length in this issue's Executive Report. Electronic publishing has disturbing echoes of the micro experience: It, too, captures a technology traditionally outside the DP/MIS purview. It, too, raises the critical issue of who will take the lead in evaluating, choosing, installing and controlling these new systems, whether desktop or corporate wide.

There is no question MIS managers are best suited to the task. Like microcomputing and now voice communications, electronic publishing is clearly an extension of a company's information flow. Like them, it significantly affects a company's bottom line: Computer-based systems promise to cut in half document production expenditures that typically account for 6% to 20% of a company's gross revenue. And it requires the ability to link components from various vendors to create a truly workable, integrated system.

Already many MIS executives are being questioned: Personal computer users inquire about laser printers; departmental managers demand new tools to quickly update technical documents; top executives want figures on how much in-house publishing could cut costs and reduce document turnaround time.

Now is the time for MIS executives to seriously consider such questions, provide the answers and move quickly to develop a consensus within general management that effective production of hard copy is an integral part of an overall information-processing strategy. They should, in short, boldly lead the charge in adapting this promising new technology.

Seizing initiative here could do much to dispel the notion that MIS too often follows rather than leads.

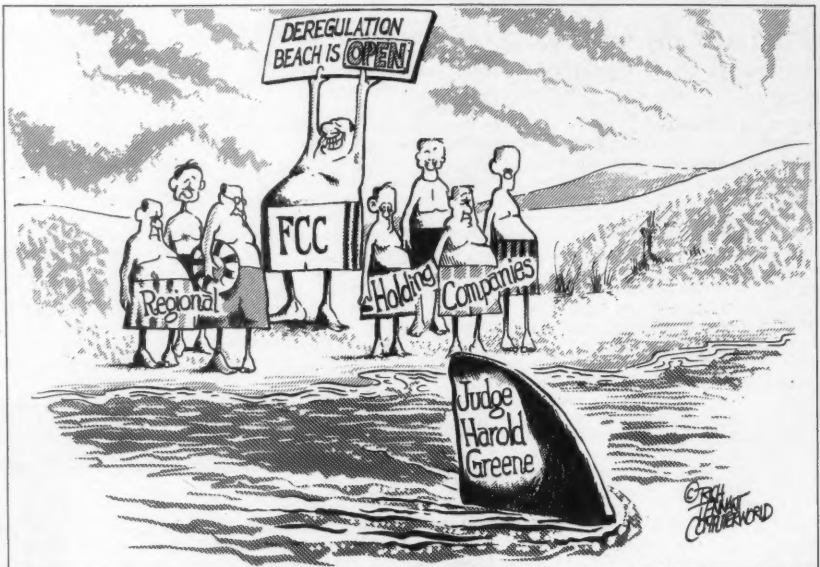
Notes & observations

Among the clear signals to the IBM user community contained in last week's exclusive *Computerworld* interview with Entry Systems Division President William Lowe were several deserving both comment and support.

The most important of these was Lowe's commitment to IBM's existing Personal Computer customer base, as the company expands its product line. "We're intent on providing a set of open interfaces, which will be on the PC as well as the intermediate and large processors," Lowe said.

His commitment to connecting the PC to larger IBM systems augurs a day when customers can have transparent data communications from the smallest to the largest IBM system.

True, all of this must be proven in the act. But given that Lowe speaks rarely in public, his considered words to *Computerworld* must be greeted with optimism and encouragement.



LETTERS TO THE EDITOR

Users, IBM see merits of System/38

It was nice to read the System/38-related articles, "Mid-line crisis" [CW, April 14] and "System/38 grows up" [CW, April 21], particularly the latter. The press has historically done a very poor job of explaining the System/38 to the data processing community. This may become more important now that IBM staff members are saying publicly in various forums that the System/38 will be assuming a more strategic role.

Several reasons have been mentioned for this new positioning aside from the merits of the System/38 itself. The System/36 is based on an obsolete design (the IBM 360, not 370) and doesn't have the power or flexibility needed. An air-cooled 4300 still requires support and staffing that is too expensive and scarce for the small and medium-size shops. Perhaps most important, the Japanese and others can produce high-quality plug-compatible versions of the 4300 for less money than IBM. By committing to the closed architecture of the System/38, which would be almost impossible to duplicate, IBM will ensure a protected source of revenue in a key market.

Many of us who work with the System/38 think that it's the best business computer that IBM makes. It just took IBM a while to realize that too.

Bill Horowitz
Chesebrough-Pond's, Inc.
Trumbull, Conn.

Controlling the surprise factor

The recent article by Neal Margolis, "High user overhead mars interface design" [CW, April 28], contained some excellent information.

The article's key point is an important one: In order to determine a product's success, it must be tested to the user's needs, not merely to the requirements. However, if the requirements don't represent the user's needs, who is it that is responsible for the surprise? The tester or the software producer?

Performing some sort of testing to identify the user's needs up front while developing the requirements specification (a technique that may include prototyping) is certainly a good idea. That kind of testing is a discovery process ("Try this. Did you like it? How about this?").

Testing applied during the development of a product, intended to uncover bugs, is a comparison

process ("Do this. Did that happen?"). This kind of testing has to be rigorously based on the products generated during the development life cycle or else the correctness of the product degenerates into a matter of opinion. Correctness means that the downstream products do what the upstream products describe. That's high quality.

A wise software developer would be worrying about how to test the specification at the same time as the specification was being written.

But testing developed and performed after the fact will only reveal surprises — surprises that will be very expensive to eliminate. The choice of which approach to take is the software producer's, not the tester's.

Software producers are responsible for the quality of the product. The quality assurance measures they take, including deciding when and where to test, determine how much surprise a software product will carry.

I realize that software developers may be tired of hearing about quality assurance. Worse than auditors who at least have the law behind them, quality assurance people (a.k.a. the program police) depend on moral imperatives to induce software producers to make decisions about the level of surprise their products will carry. These days I've taken to calling quality assurance "surprise control."

How much surprise can a product contain and still sell in the marketplace? That's the key question that software producers have to answer. The more differences between what the product does and what they specified it would do, the more inherent surprise there will be in the product. That surprise costs more to the producers in support and more to the users in overhead. And it may mean the difference between a product that sells well and one that sits on the shelf.

It's not the tester's responsibility to set the level of surprise. That's the software producer's job.

Margolis is correct: The focus of the software producers should be on the performance of the users. If they can't express the users' needs in a complete specification of the users' requirements, then the best product will not be built, despite the best efforts of testing. Don't blame poor quality on bad testing. It's more likely to be the result of poor product definition (too much "surprise allowance"), clearly the software producer's responsibility.

Mac Patrick
Pacific Bell

VIEWPOINT

Retrofitting employees: Human costs of automation

It's hardly news that automation destroys some jobs. One of the prime motivations for automating, after all, is to cut labor costs. It's true, too, that automation creates new jobs: If automation only destroyed jobs but didn't create any, then we'd expect to find most people out of work today, since a high percentage of the jobs of two and three decades ago have been changed or eliminated through automation.

Some of the people who are paid to worry about social, political and economic issues, however, fear that the rate at which automation will destroy jobs is going to increase and that newly created jobs will be offshore. In fact, few of us are immune to automation. Job loss in the future could conceivably grow to include us so-called knowledge workers. Fourth-generation languages probably haven't made any programming jobs disappear yet, but as artificial intelligence becomes a real, money saving tool in more jobs, it's sure to displace some white-collar professionals. The finance field, for example, is ripe for AI tools to replace some money managers, investment analysts and merger-acquisition specialists.

The U.S. is becoming more and more an information society, in which the basic commodity employees produce and manipulate (that is, add value to) is information. And communications technologies, such as satellites and fiber optics, make it much easier than in the past to move those jobs offshore.

How do we — employers, government, unions, employees and citizens voting on social policy legislation — deal with these realities?

Blind resistance won't work. In the long run, it's self-defeating, a guaranteed way of pushing jobs offshore.

In the 1950s and 1960s, for example, auto workers' unions tried to preserve members' jobs via a strategy that was, in practical terms, near-blind resistance to automation. Look out your window into the company parking lot if you want to see how well that strategy worked. We have only to look around us to see how many products — particularly those containing any kind of electronics technology — are produced offshore by foreign workers. In my office, for example, my IBM Personal Computer is one of the few products I see that was made here. Many jobs — by no means unpleasant, dangerous jobs — have been moved offshore permanently.

The reasons are simple. Production and technology are mobile. Com-

petition today is no longer merely nationwide, it's worldwide. It's no more expensive (and frequently less so) to produce a product in, say, South Korea, as in South Bend.

Fortunately, there are indications that all segments of society are beginning to look at automation and job loss much more pragmatically. An AFL-CIO official told me that the trend in union contracts has been for more of them to include some provision for employer-paid retraining.

One reason that formal recognition of the need for retraining is significant is that it's becoming more clear that in the future, some of us might have as many as six or seven careers during our work lifetime. In other words, it will behoove us all to start thinking about some form of retraining for the future.



By HOWARD A. KARTEN

I suspect that within the next decade, we'll regard it as an employer's obligation to make some provision to retrain technologically displaced employees; many companies today regard it as a good business practice.

IBM is probably the example that comes to mind most readily. According to an IBM spokesman, IBM's policy from its founding, called the Full Employment Practice, has been that no worker will be let go for economic reasons such as a general downturn in the economy or plant automation. IBM's average spending last year for employee training and retraining was somewhere in excess of \$2,200 per employee — for a total training bill in the hundreds of millions of dollars. (That figure includes all training, not only retraining of those displaced by automation.) Digital Equipment Corp. has a strong tradition, though not a corporate policy, of no layoffs arising from economic considerations such as automation, according to a DEC spokesman.

'We'll retrain you at our expense'

Look at the message implicit in a retraining commitment by employers. In effect, it says to employees, "Talk is cheap. Here's a concrete demonstration that we think you were all valuable contributors in the past. We don't want to lose any of you as a result of automation, so we'll retrain you — at our expense."

Indeed, if you believe that money talks, you could reasonably argue that IBM cares more about its employees than some states do about their citizens, in terms of per-capita spending for education.

Some very significant labor-saving, job displacing products from AI, robotics and other computer-based technologies can be expected to appear in the marketplace in the near future. Unless our society has thought through a coherent, practical, equitable policy for dealing with job loss, these technologies will be impeded — in which case, we'll all be losers one way or another.

When bankruptcy threatens software service contracts

Source code considered property to secure debt

Current bankruptcy laws' debilitating effects on software service contracts are demonstrated by a hypothetical example. Assume an OEM, Digital Business Technologies (DBT), wishes to acquire for sublicensing a computer program developed and owned by Thirty-One Flavors Software House.

DBT seeks assurance that Thirty-One Flavors will provide prompt debugging if necessary. To ensure continued service after fire, bankruptcy or other disruption, an escrow agreement calls for a third person or agent to hold copies of the source code. The source code will be delivered to DBT should Thirty-One Flavors fail to meet its service commitments.

Now assume Thirty-One Flavors goes bankrupt. A trustee in bankruptcy is appointed to collect property for either reorganization or liquidation. If the source code held by the agent belongs to Thirty-One Flavors, it may not be transferred to DBT, and the trustee may demand its return. Further, any license or escrow agreement purporting to transfer the source code upon insolvency or bankruptcy may be voided.

Disruptive effect rooted in insecurity

Bankruptcy's potentially disruptive effect on software licensing is rooted in the developers' insecurity over their products: Software is vulnerable to piracy.

Software users and OEMs, however, require prompt service for developers' products that, in turn, may require source code access. The tension resulting from the developers' fears and the users and OEMs' service requirements has produced tortured licensing contracts and voluminous escrow accounts.

Most solutions seeking to avoid bankruptcy's disruptive effects attempt to characterize the source code as outside the bankruptcy process. The problem is that unless there has been a transfer of ownership before insolvency, Congress intended these transactions to be run through the bankruptcy process.

Use available protections

Another as-yet-untried alternative would utilize protections available in bankruptcy law to provide access to the source code for the user and OEM.

First, create a standard escrow agreement to hold the source code. Second, execute a security agreement, similar to the kind that pledges ownership in a house as guarantee for the obligation to pay a mortgage. Instead of using real property to se-

cure a debt obligation, however, the developer uses intellectual property to secure a service obligation. The developer's speedy service of the software is the obligation.

The intended effect of this legal contraption is best demonstrated through our hypothetical example. Assume the security agreement is executed and properly filed. DBT holds the limited-use license and access rights as a creditor in possession, meaning it cannot exercise the rights unless the developer defaults on its software service obligation.

The source code is safely in the hands of the escrow agent. Thirty-One Flavors is at no greater risk than under the old escrow-type agreements because no ownership rights have been transferred, and DBT may only see the source code if the software service obligation is breached.

Now assume Thirty-One Flavors goes bankrupt. DBT may first attempt to exercise the limited-use license and access rights to service the software itself. Because the developer is protected from piracy by the license terms and no ownership interests in the source code are being affected, the trustee might permit access and the agreements work as planned.

A wily trustee may, however, attempt to block DBT's access to the source code through a turnover order against the escrow agent. Alternatively, an automatic stay may prevent DBT from exercising the license and access rights because they are the developer's property being transferred to the user or OEM at bankruptcy. Under either a turnover order or an automatic stay, the true value of DBT's "secured creditor" status comes into play.

Entitled to adequate protection

However, as a secured creditor, DBT is entitled to adequate protection under bankruptcy law when either the turnover or automatic stay provisions operate against Thirty-One Flavors' pledged property. While this provision is not entirely clear, it seems to guarantee the creditor that pledged property will not depreciate in value during the bankruptcy.

Turnovers or automatic stays lessen the value of the pledged license and access rights. Should the adequate protection concept apply, the court must fashion a remedy to leave DBT on the same footing as before Thirty-One Flavors' bankruptcy. Such an equitable remedy might include permitting DBT to exercise its access rights, designating a third party to perform the software service or ordering payments to DBT for costs of replacement software.

With the secured creditor alternative the user or OEM receives immediate judicial attention and has some legal leverage to argue for immediate access to the source code, and thus the onus is on the developer's trustee to justify denial of the license and access rights.

READER'S PLATFORM

By IRWIN B. SCHWARTZ

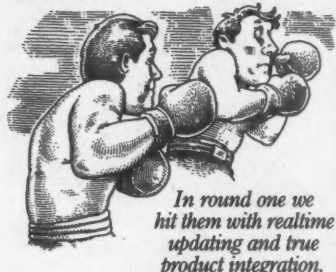
Schwartz is a third-year law student at Boston College and a law review editor there.

Now a writer and consultant, Karten has been involved with computers for two decades as a programmer, systems analyst and DP manager.

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SOFTWARE & SERVICES



SOFTLINE
Bob Didner

Changing the programmer

Programmer productivity is like the weather: People often discuss it, but to date, very little has been done about it.

Why have the so-called fourth-generation languages not delivered on their promise of a tenfold improvement in programmer productivity? And why is it that a profession that has learned to make programs run faster cannot do the same thing for the application generation process?

Perhaps it is because we are not applying the same techniques to programmer productivity as we have to program efficiency.

Programmers approach enhancing program efficiency by identifying the part of the code that the computer spends the most time executing. Perhaps the same approach can be applied to the realm of programmer activity. The industry has generally agreed where most programmer activity is spent. Between 60% and 80% is spent with non-bug-related modifications, including maintenance and user interface coding.

User interface changes in particular are one of the greatest causes of nonbug maintenance. Consider two ways that this time-consuming area of user interface design may be improved.

The first way is to use a fourth-generation language, or prototyping tool, that allows the designers to define

See **CHANGING** page 25

Didner, president of Decision Information Designs of Morristown, N.J., is a consultant specializing in systems analysis and human factors engineering.

SI adapts software to VAX

Masterpiece series merges data between applications

By Charles Babcock

ANDOVER, Mass. — A family of on-line accounting and business applications software formerly restricted to IBM mainframes and System/38s has been converted for use on Digital Equipment Corp.'s VAX line.

Software International Corp., the \$40 million-a-year software subsidiary of General Electric Information Services Co., announced today that its general ledger, accounts payable, accounts receivable, fixed assets and payroll applications will be offered as the Masterpiece Series VAX at prices ranging from \$16,000 to \$42,000 per application.

Although Software International previously marketed some applications for the VAX line, its Masterpiece Series VAX is made up of mutually interfacing products, said Frances Y. J. Wheeler, a company spokesman.

When Masterpiece is combined with the version of Masterquery designed for the

VAX, a user can access information in one application and merge it with information from another in a report or query, according to Wheeler. Masterquery uses English-like statements to access data in applications and make up reports.

Spokesmen said DEC is a user of Software International's financial software, and the two companies have jointly marketed applications for several years. Masterpiece Series VAX can run on any VAX from the 8600 series to the Microvax II.

Jeff Papows, marketing manager, said the Masterpiece general ledger application takes full advantage of the on-line capabilities of the VAX. Last-minute closing entries can be made, with the effect on postings at all levels quickly evident, he said.

The Masterpiece accounts payable application offers on-line data entry and cash requirement and commitments. Accounts receivable offers on-line access to comprehensive account activity and history to support the credit approval and collections processes.

Also included in Masterpiece is VAX Mastersecurity, which gives authorized users access to multiple applications

See **SI** page 25

INSIDE

New programming tools are coming out aimed at increasing corporate use of expert systems/24

NEW THIS WEEK

■ Swanson Analysis Systems ports Ansys to DEC Vaxstation II/GPX

■ For more on this and other new products, see pp. 85-107.

INSTANT ANALYSIS

"IBM throws grenades over the wall, and you just have to keep throwing them back."

— John Cullinane, chairman of Cullinet Software, Inc., on DBMS product competition at a recent Hambrecht & Quist, Inc. security analysts meeting

SOFTWARE NOTES

Unix release takes aim at business

Release 3.0 of AT&T's Unix System V, due out in mid-June, has been designed to make Unix more attractive to business users, according to Bill O'Shea, executive director of the Software Systems Division at AT&T Information Systems. Release 3.0's Streams feature will enable users to run applications independent of the underlying network. It separates the application interface from the protocols for communications and networking, so an application running on AT&T's Starlan one day can run

See **ADR** page 23

Orion unveils development aid

By Eddy Goldberg

BERKELEY, Calif. — The Orion Group, Inc. has released the Orion DIA Facility, a software package that will enable third-party vendors to develop business applications that support IBM's Document Interchange Architecture (DIA) directly through LU6.2.

The product represents the emergence of software applications for IBM's LU6.2 peer-to-peer communications protocol.

"Many people have been concerned that LU6.2 without any software only represents a potential. With IBM's current offerings, there are no applications to run on Advanced Program-to-Program Communi-

See **ORION** page 23

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SOFTWARE & SERVICES

ADR plans to convert tools

From page 19

without changes on Ethernet the next by swapping Streams modules. It also features Remote File Sharing, which treats all files on the network as if they were a local file system, O'Shea said.

Applied Data Research, Inc. (ADR) has made it official. It says it will convert its Dataquery end-user query language and Ideal fourth-generation applications development system to be used

with IBM's DB2 and SQL. At the same time, President Martin A. Goetz says ADR's data base management system Datacom/DB and Ideal "has a number of proven, superior capabilities over DB2."

IBM's mainframe security product RACF has been improved recently, thanks to the pressure of competing products and the lobbying of Stuart C. Henderson, organizer of a new RACF users group in New York. The **New York RACF User Group** is the third such association in the country, joining groups in Chicago and Southern Cal-

ifornia, according to Henderson, who is vice-president of Prudential Bache Securities, Inc. Henderson can be contacted at 57 Fairfield Ave., Cranford, N.J. 07016.

Uniq Digital Technologies Co. of Batavia, Ill., will support Digital Equipment Corp. VAX sites that are running **Unix System V** purchased in source code from AT&T. It will also port future releases of AT&T Unix System V to the VAX series. AT&T Information Systems has announced its intent to end support to VAX System V source code customers on March 31, 1987, Uniq Digital Technologies officials said.

Bank of America is offering a treasury management package for mid-size companies, the \$995 **Microstar Corporate Cash Planner**. With the addition of communications software, the package allows a corporate treasurer to produce up-to-the-minute reports on cash balances on an IBM Personal Computer.

The package was developed by Seafirst, a Bank of America subsidiary, which has marketed it since last year. Bank of America and other banks compete to provide software to corporate treasurers as a way of building long-term customer relationships.

Tricom Automotive Dealer Systems, Inc. of Hayward, Calif., is a little company with a big break. Tricom has signed a long-term, exclusive vendor agreement with IBM

under which IBM will market Tricom's System/36 Automobile Dealership Management System in the U.S.

Dallas Talley, Tricom president, said the value of the agreement over its undisclosed term "represents potentially 10 times the size" of the firm's revenue last year.

BMC Software President John Moores told the first meeting of the **BMC User Group** in Houston on May 16 that BMC has begun work on enhancement products for IBM's DB2. Its product line, to date, has sought to enhance CICS, IMS, VM and VTAM.

The second BMC User Group meeting is scheduled for April 29 to May 1 in Houston, according to Marianne Levandoski, steering committee spokesman and senior systems programmer at AT&T in New Jersey.

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Orion offers facility

From page 19

cation," said Orion President Paul Rampel.

The Orion DIA Facility provides distribution services, which allow documents to be distributed to network users; access to library services, which provide connectivity with IBM's Distributed Office Support System (Disoss)/370; and applications services, which allow documents to be transferred at the host site by an applications program.

The facility also provides file transfer services, which enable documents to be exchanged directly between network nodes without requiring the services of the central host.

Rampel said the Orion DIA package provides OEM customers with a menu-driven end-user interface. "You don't even know you're using DIA, except that you're talking to computers that use it," he said.

Rampel added that LU6.2 is the most efficient way to access Disoss.

Optional enhancement

The package is offered as an optional enhancement to the Orion Peer Communications Facility, which was introduced last September and supports IBM's LU6.2 and Physical Unit 2.1 (CW, Sept. 23, 1985). However, it can work in conjunction with other LU6.2 products, such as IBM's Token-Ring, Rampel said.

Included in the package is a completed application, written using DIA function calls, that emulates the electronic distribution system of the IBM Displaywriter.

The package is available immediately for Unix-based systems and can be adapted for other operating environments.

It will be sold on a royalty basis to OEMs and systems integrators.

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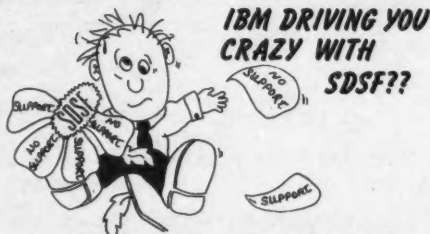
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SOFTWARE & SERVICES

AI offerings aim to accelerate adoption of expert systems

Language rewrites ease integration

By Eddy Goldberg

Artificial intelligence companies are offering a set of products intended to speed the use of expert systems in corporations.

Teknowledge, Inc., in a move to bring its expert system software products into the commercial mainstream, has rewritten its product family in the C programming language. The new versions are intended to help create expert systems that work with a company's business applications.

One Teknowledge product, S.1, rewritten in C from a LISP version, is aimed at developing large-scale expert systems. It executes faster and uses as little as 10% of the memory needed by its LISP version, according to Earl Sacerdoti, vice-president.

S.1 development software for minicomputers and workstations is priced at \$25,000 in a single-user version.

Integrated environments

Carnegie Group, Inc. of Pittsburgh announced it has integrated Knowledge Craft and Language Craft, its AI software development environments, into Version 3.1 of both products.

Knowledge Craft is a productivity tool kit for building large-scale, knowledge-based systems. Language Craft is an environment for building natural language interfaces to operating systems, expert systems, data bases and conventional software applications.

Integrating the two is in-

tended to allow programmers greater access to natural language processing when developing expert systems and to provide users with natural language interfaces, company officials said.

Version 3.1 of Knowledge Craft, \$50,000, and Language Craft Version, \$25,000, are scheduled for release during the third quarter to run on

Texas Instruments, Inc. Explorer, Digital Equipment Corp. VAX and Symbolics, Inc. systems.

Concurrent Common LISP

Intel Corp. of Santa Clara, Calif., and Gold Hill Computers, Inc. of Cambridge, Mass., introduced Concurrent Common LISP (CCLISP) for Intel's IPSC-MX family of con-

current computers. The companies claim this combination is the first commercial large-scale, parallel processing LISP system.

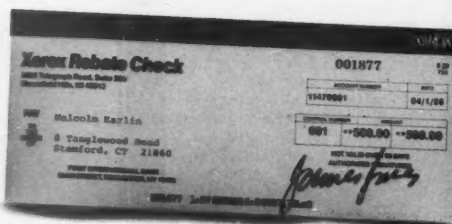
CCLISP also provides debugging tools, a display interface to each node and network services to LISP workstations.

CCLISP provides a Common LISP environment on

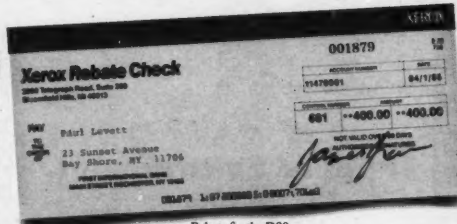
each of the multiple microprocessor nodes of the IPSC. Sixteen to 64 nodes, each with 4.5M bytes of memory, can be connected.

Prices for the IPSC with CCLISP are \$175,000 for the 16-node IPSC-MX/D4 system, \$305,000 for the 32-node IPSC-MX/D5 system and \$555,700 for the 64-node IPSC-MX/D6 system.

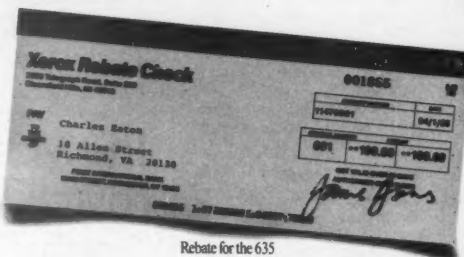
The only breaks printers are the



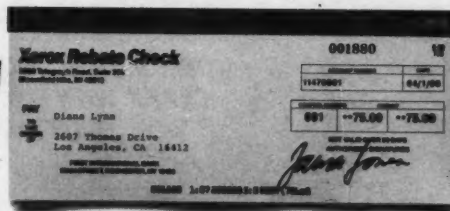
Rebate for the D801



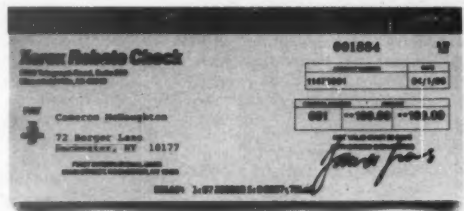
Rebate for the D80



Rebate for the 635



Rebate for the P32CQI



Rebate for the 630ECS

CORRECTIONS

A story in the Software and Services section of the April 28 edition of *Computerworld* should have noted that only the Digital Equipment Corp. VMS version of Software AG's Adabas database has been enhanced with the addition of the continuous processing option (CPO). The other version of Adabas, for IBM systems, already features CPO.

Announcing
Computerworld's
**MICRO DIRECT
SHOPPER**

SEE PAGE
125

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SOFTWARE & SERVICES

Changing the programmer

From page 19

the user interface before the defining the data base, including the data dictionary.

The user interface and data base are two separate but interrelated entities. Data or information items whose constituents are not stored in the data base can-

not be displayed. Conversely, information or data items that should not be displayed should not be stored.

The important thing to consider here is that which ever is designed first — the interface or the data base — will constrain the design of the second. Most fourth-generation languages are oriented toward application data bases rather than the interface, in that they require the data dictionary to be defined before the interface.

The second, and perhaps most important, way to improve user interface design is to improve the system design and requirements phase that occurs before application coding takes place. If a system is approved that requires up to four times more modification than original development effort, the requirements vehicles are not communicating properly.

Most requirements vehicles are paper documents containing a verbal narrative

of how system components will interact and what volumes of data will be stored and processed. These documents also contain a paper representation of what reports and CRT screens will look like.

This form of requirements vehicle does not create a complete description of the resulting system. The following are some hypotheses on why this may be.

A paper representation of a CRT screen does not accu-

rately reflect what the screen will look like, because the real screen will tend to appear more cluttered.

Perhaps most important, prose statements are inherently ambiguous, and it is unlikely that an evaluator/approver and the programmers will interpret a given requirements document in the same way.

An approach that makes more sense is to prototype the interface again and again until the evaluators and potential users are satisfied the resulting system will be both usable and useful. A faithful working model is much less ambiguous than any verbal abstraction.

In an ideal environment, the resulting prototype will be mechanically convertible into the interface of the production system.

Visual screen editor ideal

The ideal prototyping tool will have a visual (what you see is what you get) screen editor. This screen editor should be so easy to learn and use that nonprogrammers can master it with very little instruction.

The only problem with rapid prototyping tools is one of misunderstanding on the part of prospective users and clients. These individuals must be made to understand up front that in a short time they will experience something that will behave and look like the system they will ultimately receive. They must know, however, that the actual system will require several more months for creating and testing the real innards before it is available.

By combining these two proposals for improving programmer productivity, we can generate the requirements for an improved fourth-generation language.

This language would include a prototyping tool that permits a tenfold coding advantage over conventional languages and permit a fully functional prototype to be developed before a data dictionary is defined.

The approach described here will permit us to do more than talk about programmer productivity.

SI adapts tools to VAX

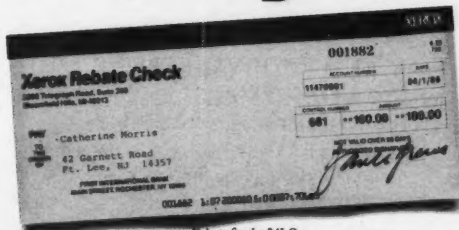
From page 19

with a single sign-on. It provides multiple levels of security.

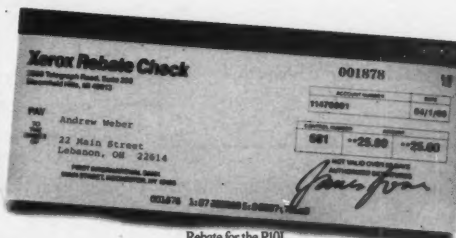
VAX Navigation allows users to move from screen to screen within each application without passing through screens they wish to avoid.

The applications are available immediately, spokesmen said.

you'll get on Xerox ones you want.



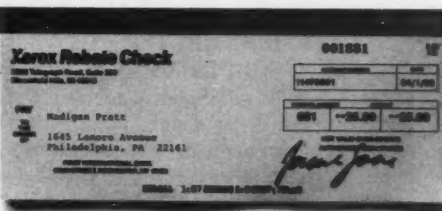
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34LQ

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MICROCOMPUTERS



SMALL TALK
William Zachmann

Hardware pick: Quietwriter

Although widely (and sometimes uncritically) admired as a company, IBM has a persistent reputation for not really being very innovative. The conventional view is that IBM's marketing and management, not its position at the leading edge of technology, makes the company so successful.

In fact, while IBM's performance is not nearly as flawless as many seem to think, its record in real innovation is much better than is conventionally believed.

Floppy disks, for example, originally were an IBM innovation. Winchester disk drives are called such after the IBM code word for the original "Winchester" disk drive product while it was in development. And the IBM Personal Computer was a much more innovative product than the consensus view would have it.

The IBM Quietwriter Printer Model 2, my personal computer hardware product pick for May, is an outstanding example of IBM innovation in action. The Quietwriter 2 uses a proprietary IBM multilayer resistance ribbon thermal-transfer technology with a 40-pin print head. The result is superb letter-quality text — better than standard letter-quality output — combined with very high-resolution graphics that rival the best that any laser printer can produce.

Until recently, personal computer users had to choose between true letter-quality character-impact printers on the one hand and dot matrix printers on the other. The former, using print wheels or thimbles, are not only very noisy but pathetically slow for graphics. The latter are simply noisy, but even the most costly of the near-letter-

See **HARDWARE** page 32

Zachmann is corporate vice-president for research at International Data Corp. in Framingham, Mass.

Javelin announces range of corporate licensing options

By David Bright

CAMBRIDGE, Mass. — In response to the growing demand for the "selective elimination" of copy protection, Javelin Software Corp. last week announced a corporate licensing and support program for its Javelin business analysis and reporting software.

Pricing begins at \$20,000 for the minimum 50 units, whether protected or unprotected, representing a 43% discount on the \$695 list price. For volumes of 100, 250 and 500 units, the respective discounts are 53%, 56% and 60%. Discounts on larger quantities are negotiable, said Javelin Chairman Robert Firmin.

According to Javelin Marketing Vice-President Dick Bonzagni, corporate users want a mix of copy-protected and unprotected software. "In developing a sales and support program for the corporate market, we first polled many of the largest personal computer user sites," he said. "We learned that most corporations want a combination of both copy-protected and unprotected versions of the software they buy in volume."

In companies with ad hoc software use — such as laboratories, in which each user

may not have his own machine — there is a need to prevent the less experienced users from unknowingly violating a licensing agreement, Bonzagni said. However, more knowledgeable users with their own dedicated personal computers may need to make copies for backup or for working at home, he added.

The first user taking advantage of Javelin's new program is the Management Systems Department of Hughes Aircraft Co. of El Segundo, Calif. "Javelin is the first software vendor to recognize how PC resources are actually managed in a large corporation," claimed B. J. Garnett, manager of the department, in a prepared statement released by Javelin.

Garnett said that instead of losing sales through the site licensing agreements, Javelin should actually profit in the long run. "Ironically, other vendors have been afraid of losing sales from a program like this, when in fact the opposite will more likely be the case. We expect to purchase more copies of Javelin because the multiple-unit licensing program will be so much easier for us to administer."

Firmin agreed that the new arrangement

See **JAVELIN** page 34

Intel pits graphics chip against TI

Micro software vendors supporting both devices

By Douglas Barney

Intel Corp. last week announced its 82786 very large-scale integration graphics coprocessor, a product aimed at speeding graphics applications, that will compete head-on against the 34010 graphics processor from Texas Instruments, Inc. Judging from the reception of microcomputer software vendors, there may be room for both devices.

Both Intel and TI will ship their products in volume in the fourth quarter and expect the devices to speed graphics 10 to 100 times by off-loading graphics functions from the main CPU. This will be especially useful on future machines that use extensive multitasking and windowing, as well as personal computers performing

computer-aided design and engineering.

In addition, both devices support laser printers, giving each a shot at penetrating the desktop publishing market. Unlike the Intel device, the TI 34010 can act as a complete CPU for a laser printer, said Brent Wientjes, TI's 34010 program manager.

Both products will sell for less than \$100 each in quantities of 1,000 or more.

The Intel 82786 coprocessor will be compatible with the IBM Color Graphics Adapter and the ANSI Computer Graphics Interface (CGI) standard. It is supported by Digital Research, Inc.'s GEM and Microsoft Corp.'s Windows operating environments as well as device drivers from Graphics Software Systems, Inc.

In addition, Ashton-Tate and Lotus Development Corp., have announced 82786 support.

Graphics Software Systems, however, has also reached an agreement with TI to

See **INTEL** page 34

INSIDE

Zenographics presentation graphics software reportedly offers 360 million colors on IBM Personal Computers/30

Cauzin Systems upgrades its Soft-strip Reader with output ability/30

NEW THIS WEEK

■ Samna Corp. offers Samna Decision Graphics software for the IBM PC

■ Tandy introduces new model of IBM Personal Computer AT compatible

■ For more on these and other new products, see pp. 85-107.

INSTANT ANALYSIS

"Every time somebody finds a bug in a new version of MS-DOS, there's all this speculation over whether it's really a bug or some sort of window to the future of the operating system."

— Dave Melin,
Microsoft Networks
product marketing
manager,
Microsoft Corp.

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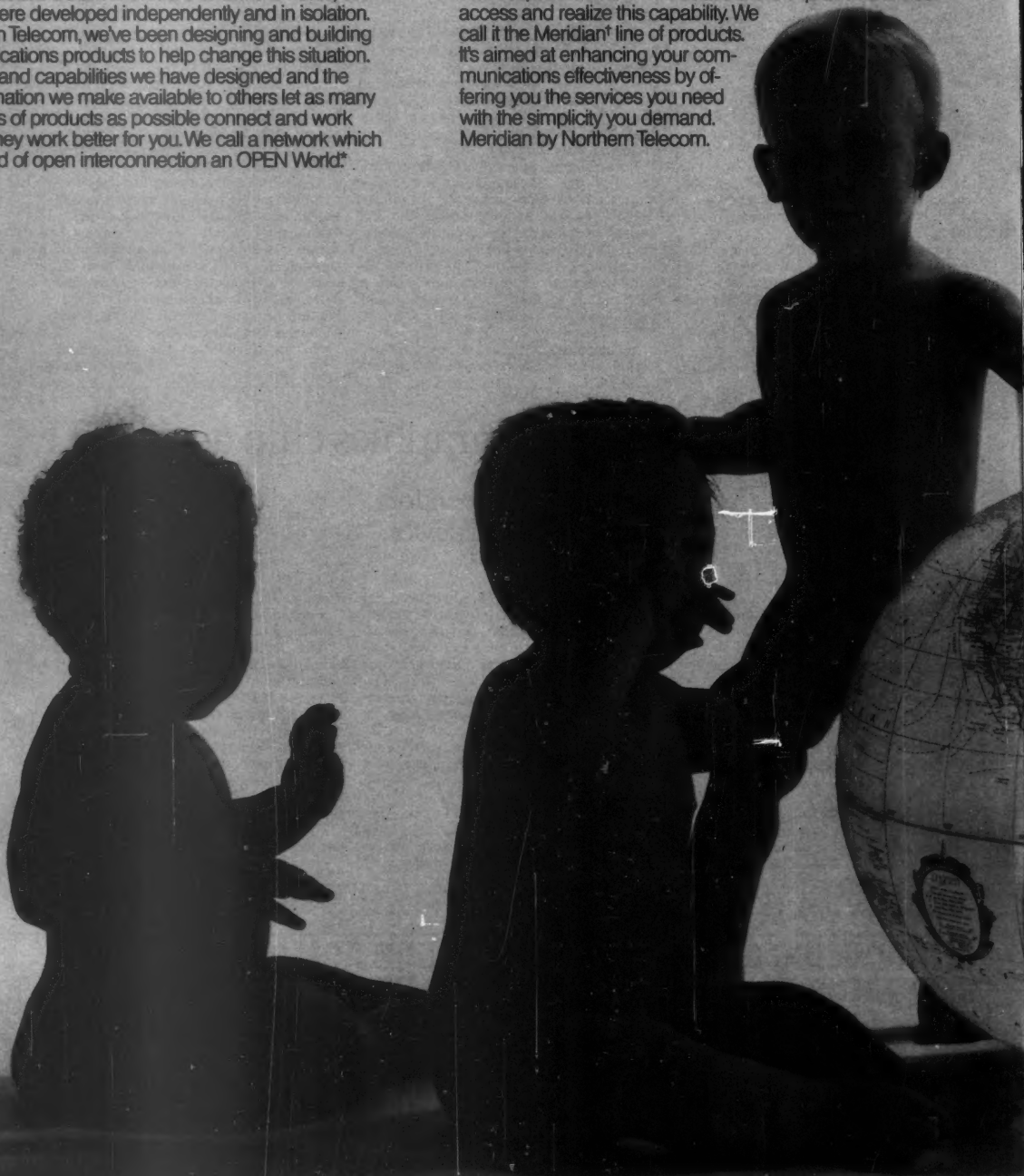
INTEGRATED—People in different parts of the world have different customs and speak different languages. That's because they were relatively isolated, and their cultures developed independently before the days of radio, television, telephones and fast, easy transportation. Sometimes, it's hard to communicate.

Similarly, computers and other equipment made by different manufacturers often find it hard to communicate, because they were developed independently and in isolation.

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SERVICES—You don't need to understand what makes a telecommunications network tick to use it. For you, the network is just the communications services you need. And of course, the actual telephone or terminal you use is one means of accessing such services.

At Northern Telecom, we have defined and are building into the network a tremendous capability for the provision of services, and we have introduced a line of products to both access and realize this capability. We call it the Meridian[®] line of products. It's aimed at enhancing your communications effectiveness by offering you the services you need with the simplicity you demand. Meridian by Northern Telecom.



DIGITAL—Most people find that the best approach to solving a problem is the simplest approach. In telecommunications, the simplest way of carrying information is to convert it to a series of 1's and 0's—a digital bit stream.

A digital bit stream can mean anything—it can be your voice, a letter, a television picture, or the manufacturing diagrams for a new car.

At Northern Telecom, we've been designing and building telecommunications products based on the simple digital bit stream for two decades. We call a network that handles all information in digital form a Digital World.*

NETWORKS—In sports, a winning team starts with a good game plan, and adapts it in real time based on the changing flow of the game.

Up to now, telecommunications networks have followed a very static game plan. They were built mostly of separate elements to handle predictable changes in needs on a long-term basis. There was almost no way of controlling them in real time, so they provided little current information about overloads or breakdowns or anything.

At Northern Telecom, we have developed a new way of designing and controlling telecommunications networks. It's a game plan for public or private network architects who want to design and run their whole network like a winning team. It also lets networks carry different kinds of information more easily and economically and thereby provide the basis for supporting new services and capabilities for you.

We call it Dynamic Network Architecture.*

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NETWORKING

MICROCOMPUTERS

Zenographics software rivals graphic power of mainframes

Produces 360 million colors using IBM PCs

By Douglas Barney

ANAHEIM, Calif. — At the National Computer Graphics Association show earlier this month, new versions of Zenographics, Inc.'s Mirage and Autumn presentation graphics programs, said to rival the output of mainframe graphics programs, won the "Graphics Software Shootout."

Both the \$895 Mirage package and the \$595 Autumn package can produce up to 360 million colors using standard IBM microcomputers with

color displays and 64 shades of gray and black on computers without color capability, according to Zenographics.

These products also support most popular brands of graphics output devices, including laser printers, inkjet printers, thermal ink printers, film recorders, graphics cards and plotters.

In many cases, the graphics output of these devices is enhanced by using Zenographics software. "We extended the color capabilities of output devices," said Michael Behnke, vice-president of marketing.

Mirage is an integrated package that can receive data from either a mainframe or microcomputer and in-

cludes a file manager, graphics editor and charting module.

Autumn is said to be an easier to use package that provides more than 100 predefined chart formats that allow novice users to easily create charts and graphs.

In addition, Zenographics announced two add-on products for Mirage and Autumn. The \$95 Typefaces software provides a family of typographic quality, bit-map fonts that are geared toward lower resolution devices and smaller type sizes, as well as polygonal fonts, which are geared toward larger characters and high-resolution devices. Both Helvetica-like fonts and Times-Roman-like fonts are included. The \$95 Symbols

package provides hundreds of scientific and business images, the firm claimed.

Mirage and Autumn run on IBM Personal Computers and compatibles with at least 320K bytes of random-access memory.

Zenographics also offers the software on larger systems. "It was designed to be portable," Behnke said. "We don't just run on the PC, XT, AT; we also run on VAX, Prime Computer, Inc., IBM CMS, IBM MVS, and we have prototype systems on Univac [Sperry Corp.] and International Computers Ltd."

Prices of the software on larger systems range from \$15,000 to \$30,000.

MADE FOR EACH OTHER.

Softstrip lets PCs trade files

By David Bright

WATERBURY, Conn. — With new software from Cauzin Systems, Inc., personal computer users equipped with the vendor's Softstrip Reader can store programs and files as printed strips on plain paper. The strips can then be read by any other personal computer.

Available now, the \$19.95 Stripper software reportedly encodes any file and allows it to be printed on a dot-matrix or nonimpact printer as a 1/8-in. by 9 1/2-in. strip. Connected to a personal computer via an RS-232 port, the \$199.95 Softstrip Reader then can transfer the information to another microcomputer.

When the Softstrip System was introduced last fall, it had reading — but not storage — capabilities.

Key applications for the software include the transfer of word processing files, spreadsheet templates, bank statements and hospital information, said Cauzin Marketing Vice-President Neil Kleinfeld. In addition, over two dozen magazine and book publishers will soon be printing free strip programs in their publications, Kleinfeld claimed.

Kleinfeld stressed that the equipment is not intended to duplicate copyrighted programs or be an alternative to disks. "It will not replace magnetic disks," he said. "It is a complement to disks, rather than a replacement."

For example, if users of the IBM Personal Computer or Apple Computer, Inc. Macintosh need to work with one particular template created with Lotus Development Corp.'s 1-2-3 or Jazz, "you just print up one strip and everyone can use it," Kleinfeld claimed.

Actually, since each strip contains between 900 and 5,500 bytes, depending upon the resolution of the printer, several strips may be necessary. But the software will sequentially number the strips.

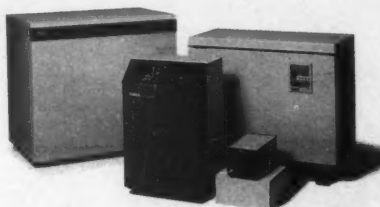
According to Kleinfeld, operation of the menu-driven software takes five minutes to learn. The user does not have to specify the computer models being used; when the strips are printed, the software includes information about the originating computer.



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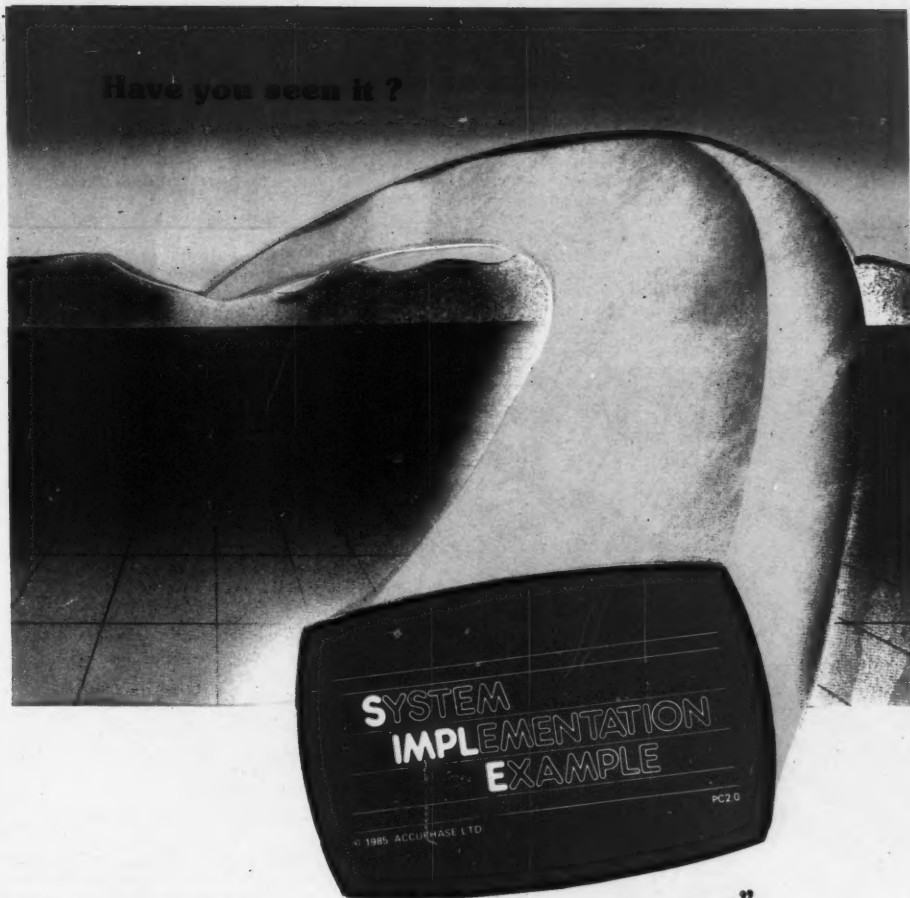


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MICROCOMPUTERS

AT&T, Samna offer OA tools

MORRISTOWN, N.J. — A joint development effort between AT&T Information Systems and Atlanta-based Samna Corp. has produced two office automation packages for the AT&T Personal Computer 6300 and other IBM-compatible microcomputers. Both packages will be marketed by AT&T.

According to AT&T, the Write Power 1 package offers standard word processing features plus DIF, ASCII and IBM Document Content Architecture translation; a pop-up message window to record telephone messages; mail merge; and forms creation and mapping capabilities. The package can also use the new AT&T Model 7500S Electronic Typewriter

as an I/O device, the company said. Write Power 1, currently available, is priced at \$495.

AT&T's Write Power 2 incorporates Write Power 1's features along with an integrated spreadsheet and the Wordbase Manager, which reportedly searches through all files on a disk to locate any word or group of words and reports the file that contains them. The software also provides automatic table of contents and index generation. Write Power 2 will be available in July for \$745.

Both packages feature hot-key connectivity to Digital Communications Associate's Irma card and compatibility with AT&T's Starlan local-area network, AT&T said.

Hardware pick: IBM Quietwriter

From page 27

quality dot matrix printers still produce rather distinctive dot matrix-style output.

Within the past few years, laser printers have begun to offer an attractive alternative. But these are not only expensive, they are relatively complex devices as well. "Relatively complex" translates, unfortunately, into relatively prone to failure and extremely difficult (if not downright impossible) to repair when broken.

The IBM Quietwriter 2 offers the simplicity and reliability of a dot matrix printer, the text and graphics

quality of the best of the laser printers, extremely quiet operation and reasonably high speed, all at a price (\$1,595) comparable to that of a good printwheel or thimble-impact printer.

For my money, it may be the best choice for an all-around personal computer printer these days.

The Quietwriter 2 printing technology is the same as that used in IBM's high-end Quietwriter 7 typewriter. Like the earlier Quietwriter Printer Model 1 (which lacks graphics capability), it works with the same ribbons, type font cartridges and user-replaceable print heads as the typewriter. This should ensure ready availability of supplies.

In character mode, the Quietwriter 2 operates in the range of 40 to 60 char./sec. Although relatively slow compared with high-performance dot matrix printers, this is fast enough for most users and much faster than most character-impact printers.

In the all-points-addressable graphics mode, the Quietwriter 2 is not exactly a speed demon. However, it is much faster than a printwheel printer in comparable applications. While volume production applications would require a faster (and much more expensive) device, I find the Quietwriter 2 quite adequate for personal use for graphics output.

The Quietwriter 2 high-resolution graphics mode offers a choice of 60 by 60, 120 by 120 or 240 by 240 dot/in. Another mode offers compatibility with the IBM Graphics Printer and Proprietary at 72 by 60, 72 by 120 or 72 by 240 dot/in. In the higher resolutions, the Quietwriter 2 offers graphics quality that exceeds that of most laser printers.

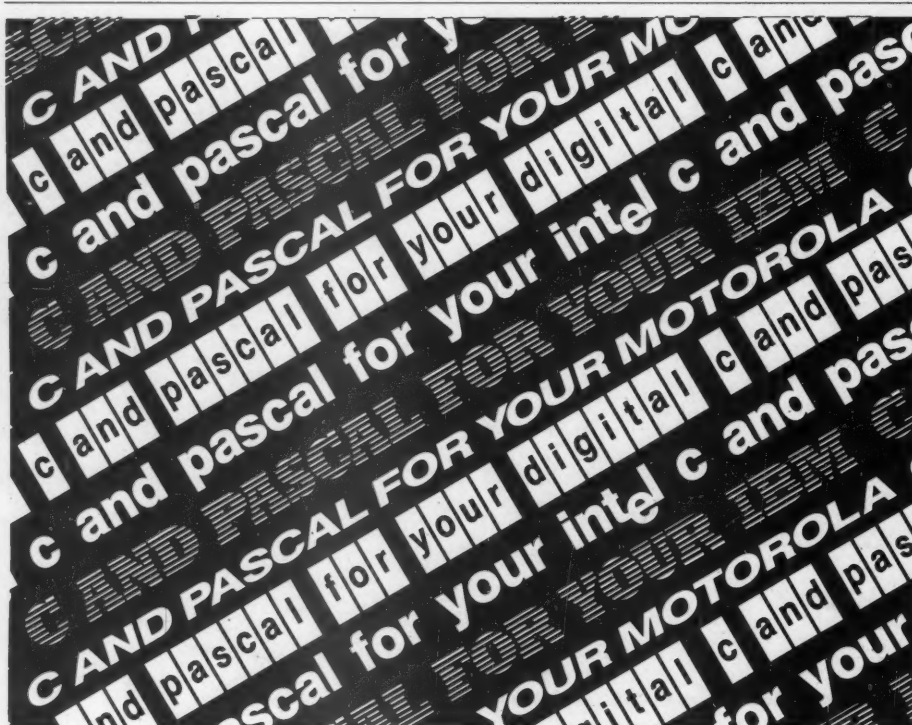
Caution about software compatibility

But a note of caution is in order about compatibility with current software. Despite the compatible features it shares with the IBM Graphics Printer and Proprietary, the Quietwriter 2 does not typically work directly with software drivers written for those devices.

At a minimum, printer control codes must be sent to the printer to put it into compatibility mode. This can be done with software that includes provisions for sending printer setup strings. However, much popular personal computer software not only lacks such provisions but does not even allow for user-provided device drivers. As a result, the Quietwriter 2 cannot be used with many software packages until the software vendor provides a driver.

This is really only a short-term problem, since software vendors will certainly provide drivers for the IBM Quietwriter in the near future, if they have not already. However, it can certainly be a short-term annoyance for a user who expects (as the IBM product literature implies) that the Quietwriter 2 can be directly substituted for an IBM Graphics Printer without modifications to existing software.

Overall, the Quietwriter 2 is an excellent device offering what will strike many as the best compromise between price and features for a general-purpose personal computer printer. Available options include a sheet feeder as well as a continuous form feeder and a large selection of character type font cartridges. The device prints on transparencies as well as on plain paper stock.



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MICROCOMPUTERS

DBMS reads Dbase directly

By Douglas Barney

BURLINGTON, Mass. — Alpha Software Corp. this month released Alpha/Three, a \$395 menu-driven data base manager that uses the same file format as Ashton-Tate's Dbase III, currently the leading microcomputer data base product in large corporations.

Alpha/Three can read and write to Dbase disks directly, avoiding the format conversion process that tends to create redundant and inconsistent data files. "File conversion is a pain in the neck," Alpha President Richard Rabins said.

Alpha expects its new data base to complement Dbase within corporations. "Data bases fall into two classes, menu driven and command driven. We are sure that we are the first to come out with a powerful menu-driven product that uses the Dbase files natively," Rabins claimed. "A company that has standardized on

Dbase in the high end is given a compelling reason to choose Alpha/Three for their menu-driven product."

Alpha believes the product can stand on its own merits as a stand-alone package. According to Rabins, Alpha/Three has sophisticated report writing, form generation and mailing list capabilities.

"You can do very sophisticated reports without programming. It is a very visual, free-form report writer," Rabins noted.

Alpha/Three also offers a built-in form letter generator and basic word processing capability. "We have built logic into the form letter; you can make the text vary depending upon the status of one of the fields," Rabins said.

Alpha/Three runs on IBM and compatible personal computers with at least 320K bytes of random-access memory. A hard disk drive is recommended.

True Basic Programming Libraries get six 'volumes' for IBM PC use

HANOVER, N.H. — True Basic, Inc. this month announced six additions to its True Basic Programming Libraries, a set of tool and utility companion products for the True Basic language on the IBM Personal Computer.

The additions, each priced at \$49.95, include The Developer's Toolkit, Communications Support, Forms Management Library, Btrieve Interface, Sorting and Searching and Advanced String Library.

According to the company, The Developer's Toolkit provides routines for creating, reading and removing subdirectories; hiding and unhiding files; switching between displays; loading registers and triggering interrupts.

Communications Support reportedly allows simultaneous use of two communications ports at up to 19.2K

bit/sec., along with interrupt-driven operation with fully buffered input and output.

Forms Manager Library is said to offer a group of easily modified forms and input checking routines.

According to the company, Btrieve Interface allows programmers to access Softcraft, Inc.'s Btrieve file management package, permitting the management of data bases with up to 4M bytes per record and 24 key fields per file.

Sorting and Searching gives 14 subroutines for both string and numeric sorting, including quick sorts, heap sorts and multikey sorts, the company said.

Advanced String Library offers pattern matching, expression scanning, parsing, text manipulation and a 38,000-word English dictionary, according to True Basic.

Intel pits graphics chip against TI

From page 27

make the 34010 compatible with the CGI graphics standard. TI also has been negotiating with Microsoft and is completing a port to make Windows compatible with the 34010.

The success of both devices is likely to be tied to that of environments such as Microsoft Windows. "If Windows is hot, this also has to be into the same category," said Ron Goldfarb, manager of office automation for Pratt & Whitney Administration, of East Hartford, Conn. "If we jump through the window with both feet it will be a helluva product."

"TI is probably our biggest competitor right now," admitted Mark Olson, product marketing manager in

Intel's graphics component operation. Intel's device is essentially self-contained, and nonprogrammable. The TI device has fewer built-in instructions. "The TI product does have a certain amount of flexibility, but it is still software that executes the drawing instruction set, and ours is tuned hardware that executes it much faster," Olson claimed.

But TI argued for the programmability of its chip. "As algorithms evolve or user interfaces evolve or standards evolve, you can migrate with the product," Wientjes said.

The Intel device will work with all Intel microprocessors, Digital Equipment Corp.'s Microvax, Zilog Z80-based machines and Motorola, Inc. 68000-based machines. TI's 34010 also will work in many architectures. "We are independent of the host processor. We work equally well with a Motorola 68000-based bus or an Intel 8086-based bus," Wientjes said.

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Javelin offers licensing options

From page 27

ment would give Javelin "much more leverage per sales call," adding that his company would make a good return on a minimum license for 50 units.

At press time, Hughes Aircraft was the only licensee, but Firmin said Javelin was in the process of closing several other deals, most covering 100 or 250 units.

In addition to discounts, the new arrangement gives corporations uniformity of software releases, Firmin pointed out.

The unprotected version of Javelin can be copied using standard IBM PC-DOS commands. Under the corporate purchasing agreement, the software customer must record specific users of unprotected Javelin along with the software's particular copy number. Furthermore, individual users must also agree in writing not to make copies for others to use, according to the Javelin purchasing agreement.

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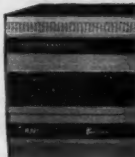
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COMMUNICATIONS



DATA STREAM
Elisabeth Horwitt

Having a say in standards

This is the year that standards bodies will be making decisions about the way companies will link their computers for the next decade or so. The Corporation for Open Systems (COS), the MAP/TOP Users' Group and the rest have encouraged participation from the user community. Why, then, are the small- to medium-size companies not exercising their right to take part in the process?

I noticed it at the recent MAP/TOP Users' Group meeting in Seattle: non-Fortune 500 user companies were scarce to nonexistent. The corporate communications and DP managers I encountered at the sessions all seemed to come from the same select group of Fortune 500 aerospace and automobile manufacturers. Smaller businesses — and I don't mean 12-person firms but sizable companies with multimillion-dollar revenues — seemed to have kept their people home.

Of course there were exceptions. I spoke to William Shurtleff of Sandia National Laboratories, an Albuquerque, N.M., company that develops nuclear weapons. He said his company sent him to the conference because "we have a bunch of computers we want to link, and MAP is the only game in town; it isn't a network just for the factory, it just started there."

I also ran into a Michigan Bell representative who said his company wants to figure out how to interface its transmission services with the growing number of corporate MAP networks in the Detroit area. And of course, there

See **HAVING** page 40

Horwitt is Computerworld's senior editor, communications.

Intellihub gets trial run

Network service said to get users on road to ISDN

By Stanley Gibson
and Elisabeth Horwitt

Intellihub, the latest in a series of dedicated, digital network services introduced by New York Telephone Co., will take users "another step on the road to ISDN," a company spokesman claimed. The service will be provided to Manhattan, N.Y., brokerage house L. F. Rothschild, Unterberg Towbin for a 12-month trial period if a contract currently under discussion goes through, according to New York Telephone. Based on the Northern Telecom, Inc. DMS-100 digital central office switch and Dynamic Network Controller, the service will become a tariff offering sometime in the first quarter of 1987, the operating company said.

According to a Rothschild telecommunications staff member, the Intellihub system will both save the company money and make its current system easier to use by eliminating tie lines and some 16 WATS lines. As the only so-called "first applica-

tion" customer, Rothschild will not pay for Intellihub services, he noted. While the initial offering will only support voice communications, data transmission will be added in the third quarter of this year, according to New York Telephone.

Intellihub is based on four Pathways digital customer-to-central office transmission services introduced by New York Telephone in the spring of 1985. These include the Superpath 1.5M bit/sec. Service; Flexpath Digital PBX Service, which provides a 24-channel, T1 link between a customer's digital private branch exchange and central office facilities; Infopath Packet Switching Service; and Switchway 56K bit/sec. Service, which offers 56K bit/sec. transmission over ordinary, circuit-switched lines.

According to Intellihub Project Manager Sergio Cruz, the Pathway services offer customers "an easy migration path to ISDN." The service offerings will run on dedicated private lines between customer and central-office facilities until the operating company's all-digital network is complete. "Then everyone can use virtual private circuits instead of dedicated

See **INTELLIHUB** page 44

NCR Comten aims to outgun IBM's SNA, adds VLSI, cache memory to 5660 line

By Elisabeth Horwitt

Continuing to challenge IBM in the mainframe communications processor market, NCR Comten, Inc. last week introduced Comten 5660, a line of communications processors that reportedly are three times faster and offer more line connectivity than any other Systems Network Architecture (SNA)-compatible communications processor on the market.

"We believe that the 5660 represents a new generation of communications processors," said David Anderson, NCR Comten marketing strategy and planning manager.

Added logic features such as very large-scale integration (VLSI) and cache memory give the 5660 approximately three times the processing power of the IBM 3725 communications processor, he added. This en-

ables the system to support up to eight mainframes and 1,024 full-duplex communications lines, compared with a 256-line upper limit for the IBM 3725, according to Anderson. The 5660 can also support 1.54M bit/sec. T1 lines while performing other tasks concurrently, an NCR Comten spokesman said.

"Having that much power and connectivity in a box means you can get by with fewer communications processors with a big network," Anderson said. "That means you save on manpower and software, since every time you add another processor you have to do another system generation."

The 5660 features up to 16M bytes of main memory, compared with 4M bytes for the older Comten 3690 communications

See **NCR** page 40

NEW THIS WEEK

- Honeywell offers an electronic six-wire key telephone system

■ For more on this and other new products, see pp. 85-107.

INSTANT ANALYSIS

"Our strategy is to encourage other network vendors to interface with our network management system, to give end-to-end management capabilities to our customers, whose complex networks, we realize, often contain non-IBM equipment."

— William Warner, manager, network management products, IBM

Texas department puts cart before horse in choosing network

Selects micro software tools before hardware

By James A. Martin

AUSTIN, Texas — "Our decision to pick the software before the hardware for our new networking system was like putting the cart before the horse," said Terry Parmley, administrator of the applications support division of the Texas Department of Human Services (DHS).

DHS hopes by early 1987 to bring on-line a data network linking some 3,000 IBM Personal Computer ATs, which have yet to be installed at the 90-odd DHS branch offices throughout Texas. PC ATs within each office will share files and send messages

over a local-area network. A communications processor installed on each network will act as a gateway to a remote link to Sperry Corp. 1184 and 1191 mainframes located at DHS' Austin headquarters.

While some companies would consider the personal computer network to be the key element in this system, DHS' first priority was to find the right fourth-generation language to facilitate caseworkers in accessing and maintaining the information they need to deal more effectively with clients.

"We decided three years ago to put automation in for caseworkers in dealing with clients," said L. D. England, deputy commissioner for information systems. "This would help us achieve productivity with heavy

work loads and give caseworkers the opportunity to determine benefit eligibility while the client is there."

An agency with a \$2.4 billion budget, DHS wants to enable caseworkers at its branch offices to maintain client files locally and also access the mainframe files in Austin. "The mainframe holds the rules and regulations governing benefit eligibility requirements, which are constantly changing," Parmley said.

Under the current system, client information used to determine eligibility for state welfare programs is taken down by the caseworker, then sent on as hard copy to data entry operators, who enter it into the Sperry mainframes on some 200 Sperry UTS400 terminals. The client sometimes waits two weeks to find out if

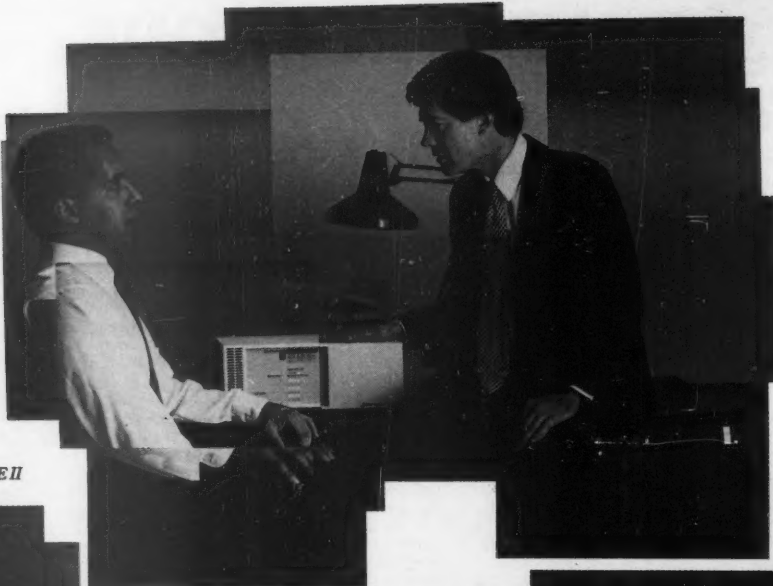
he is eligible, Parmley said.

The new system will enable caseworkers to bypass the paperwork and the data entry operators and directly input the data on PC ATs. Caseworkers will also be able to "determine eligibility on the spot" by obtaining pertinent data on the mainframe in real time, Parmley said.

Caseworkers will maintain their client files from the last two years in file servers at each branch office. "Things that have been sitting in file drawers will gradually be keyed into the system. We should have 35G bytes of on-line client information by 1990," Parmley noted.

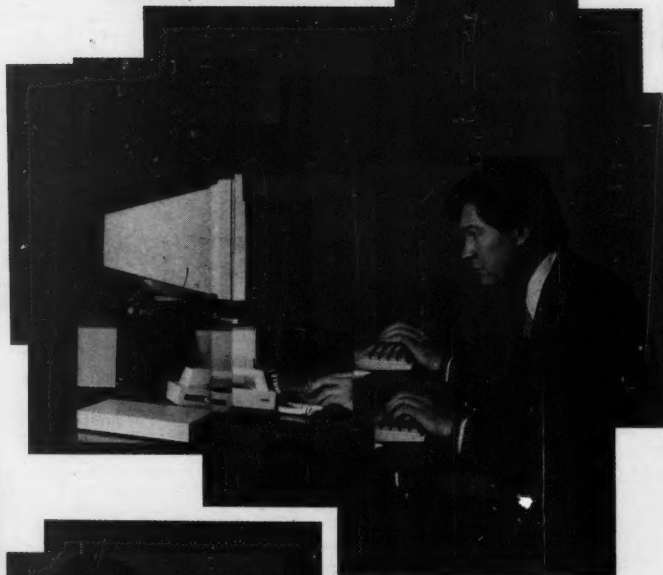
DHS projects it will save \$130 million in expenses during the next five years by eliminating the clerical

See **TEXAS** page 40



AT&T 724 Multiplexer

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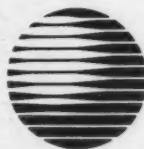
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COMMUNICATIONS

Having a say in standards

From page 37

was a sizable contingent of consultants and vendor representatives.

But the majority of corporations represented at the MAP/TOP Users' Group were the manufacturing and financial giants on the leading edge of networking technology. The same applies to COS, now that it is open to user organizations. And, while I have seen no membership roster for the American National Standards Institute, I would bet the users that sit on its working committees have similar affiliations.

According to Richard Miller, president of Palo Alto, Calif., consulting

company Telematics International, participation in the direction of evolving standards is "too expensive a franchise for low-end users. They just can't afford to send their own representatives to these meetings on a regular basis."

The question is whether they can afford not to. More and more MIS and DP directors are saying that data communications is a top priority at their companies.

At the same time, the emphasis has moved from isolated local-area networks linking a department's or branch office's IBM Personal Computers to "enterprise networks" that link the resources and users of an entire corporation, then extend to suppliers, distributors and customers. This makes networking standards a key issue, because the wider a company casts its networking net,

the more diverse the range of systems with which it needs to communicate.

Any company that plans to make data communications part of its competitive strategy can benefit from participating in, or at least hearing about, the standards bodies' latest activities. But the price is high.

Who but someone like General Motors Corp. or McDonnell Douglas Corp. can spare MIS executives to sit monthly on a committee that is hammering out specifications for sending commands to robots? What small company can afford to fly its managers cross-country to a users' conference, where they do nothing productive except listen for three days?

Miller suggests that smaller companies can get around the financial problem by pooling their resources. He suggests they form a consortium

of businesses from the same geographic region with similar networking priorities and send a representative to the standards group meetings that seem most relevant.

This sounds like a fine idea to me. The consortium could jointly hire a consultant whose sole job would be to participate in the standards development process.

Regular attendance is a must if your envoy is to keep abreast of new issues and not be swamped by the rapidly proliferating jargon that technical committees love to use. I hesitate to accuse one TOP working committee of being deliberately esoteric. But was it really necessary — particularly during a presentation that was purportedly for the edification of the MAP/TOP user community at large — to refer to 5M bit/sec. baseband cable as "5base36"?

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NCR Comten to outgun IBM SNA

From page 37

processor, Anderson said. This enables the 5660 to support value-added capabilities, such as mixing SNA and non-SNA switching on the same trunks, he added. "Plus, NCR Comten will be expanding our network management control capabilities in the future, and we need that memory space."

The product incorporates a service subsystem with built-in self-testing and remote diagnostic capabilities, according to NCR Comten.

A Comten 5660 system supporting eight mainframes and 780 communications lines costs \$1,230,000 plus \$4,570 monthly for maintenance. The product will be available in the fourth quarter of 1986.

Texas DHS puts cart before horse

From page 37

work of storing and accessing hard-copy files at branch offices and by helping workers to estimate benefits more accurately. "We have been awarding benefits that people are not eligible for," Parmley admitted.

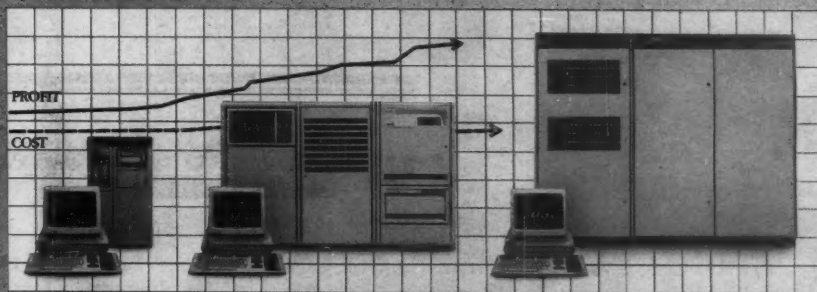
In September 1985, DHS tested and selected Revelation, a fourth-generation language from Cosmos, Inc. "Revelation met our requirements for handling large records," Parmley commented. "It has a flexible development environment and a good data base management package."

Revelation works with a wide range of networking products, including IBM's PC Network and approximately 30 network offerings that run under Novell, Inc.'s Netware software.

DHS will not know until August what vendors will be selected to supply the local-area network, communication interface as well as other hardware.

The agency gave no network cost projections. "Since there are bids still out, the less the vendors know how much we have to spend, the better off we'll be," England said.

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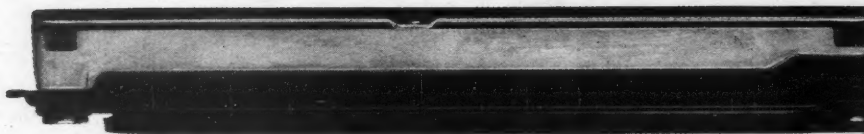
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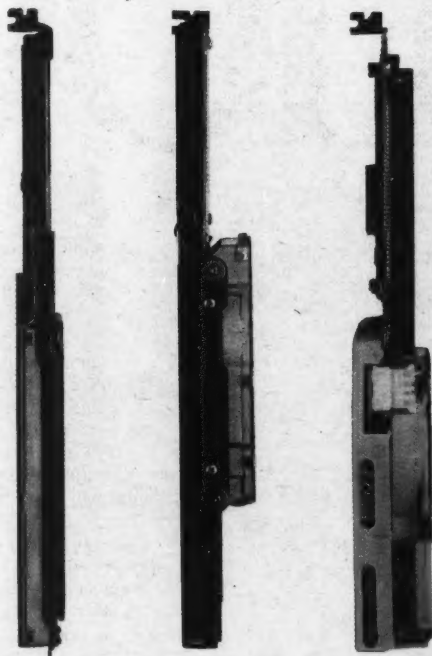
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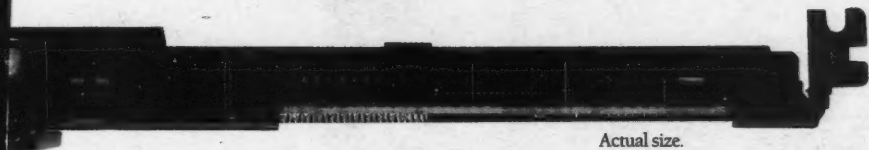
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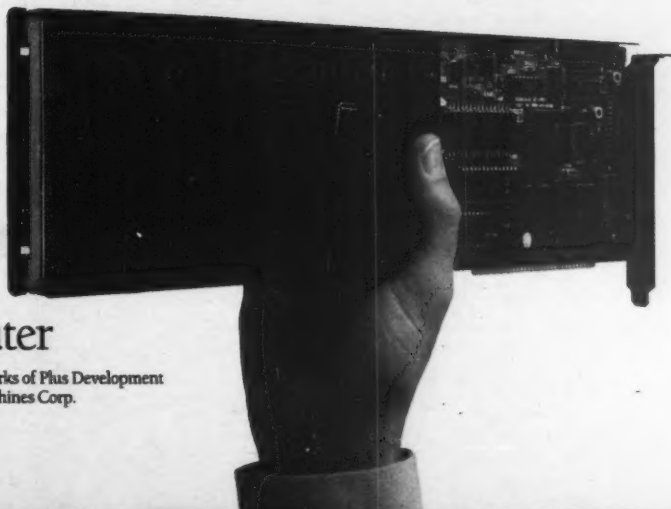
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COMMUNICATIONS

Intellihub gets trial run

From page 37

lines."

Intellihub adds to the Pathway offerings two capabilities that reportedly will be standard Integrated Service Digital Network (ISDN) features, Cruz said. The first is dynamic network reconfiguration.

Through a terminal at the customer's premises to the Dynamic Network Controller at the local central office, customers can make real-time routing choices as to which long-distance carriers and services will be used as primary and backup links between New York Telephone premises and various area codes.

New York Telephone's Centrex customers can also make routing changes, "but they have to put in a change

order, which can take five days or two weeks to go through," Cruz said. "With Intellihub, it goes in instantly so you can take immediate advantage if, say, MCI Communications Corp. is giving a special discount for the month of June."

Intellihub customers also can enter a command to pull a faulty circuit off the line. One feature ISDN reportedly offers that Intellihub does not is dynamically reconfiguring customer premise-to-

central office bandwidth.

Call accounting gathers data on the length and frequency of both completed and unanswered calls handled by each circuit. Because New York Telephone is barred by Computer Inquiry II regulations from offering processing services at its central offices, users download the data over a Switched 56 circuit to their own systems for report generation.

New York Telephone, Northern Telecom and L. F.

Rothschild representatives appeared to have conflicting view about how Intellihub relates to the operating company's future ISDN services.

"Conceptually, it is ISDN," said the Rothschild telecommunications staff member, adding half-humorously, "But who knows what ISDN is?"

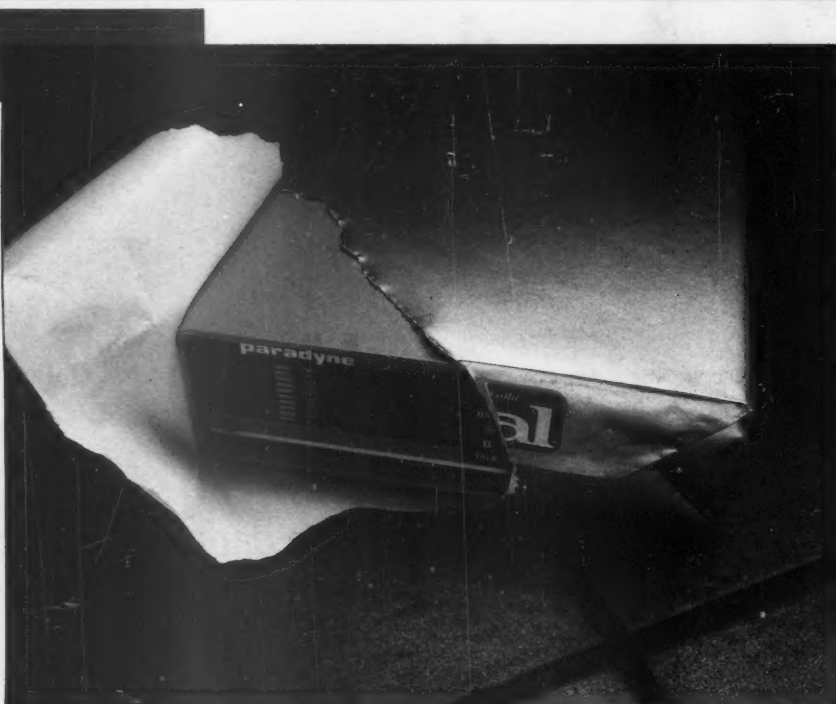
According to Northern Telecom, Intellihub offers the full range of ISDN capabilities, except for out-of-band signaling. The currently dominant ISDN specifications divide bandwidth into clear 64K bit/sec. B channels that transmit voice and data and separate D channels that carry signaling.

New York Telephone's Pathway service offerings use the T1 channel specifications that divide a 64K bit/sec. channel into 56K bit/sec. for voice and data and 8K bit/sec. for signaling. The Northern Telecom spokes-

??

**'Conceptually,
it is ISDN, but
who knows
what ISDN
is?'**

— Rothschild
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staff member



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man added that New York Telephone will be converting to the ISDN "Clear 64" standard in 1987.

Cruz said that the Northern Telecom DMS-100s that handle the digital services already support Clear 64. He added, however, "I'm not sure that the U.S. will adopt Clear 64 or stick with 56K. The problem relates to the cost of converting existing wiring plants."

"The idea that 56K will become the ISDN standard is nonsense," said Daniel Rosenbaum, editor of "Wiretap," an information industry newsletter based in Morristown, N.J. He added that he thought that migration from 56K bit/sec. transmission to Clear 64 is "largely a matter of software. AT&T is already ready to do it."

For customers thinking about installing networking equipment before the industry completes its migration to ISDN, Rosenbaum suggested, "Leave yourself in the position to write it off. Changing from 56K to 64K will be largely a matter of changing multiplexers or coders/decoders; how expensive it gets to be depends on whether you lease or buy."

Rosenbaum suggested that New York Telephone is starting out by offering ISDN-like services on existing 56K bit/sec. channels, planning to convert to ISDN specifications when the standards are in place.

SYSTEMS & PERIPHERALS



HARD TALK
Donna Raimondi

Thin-film woes finally aired

IBM and the plug-compatible manufacturers have been as open about IBM 3380-type thin-film head disk problems as the Soviet Union has been about Chernobyl. Big Blue and others pretty much follow the philosophy that if the users are not screaming to the press about it, it need not be aired publicly.

MIS managers have been complicitously quiet about thin-film technology problems. As long as the vendor will fix the problems, customers remain hushed in order not to embarrass or antagonize their vendor.

Now one company — Memorex Corp. — has decided to step out of the thin-film problem closet.

The company recently exposed a number of problems that have plagued it since it started offering the thin-film devices in 1984.

From the beginning of Memorex's disastrous experience with thin-film head disk interference — when the head hits the spinning disk — the company kept meticulous records of where, how and why the interferences occurred, said Cleayton Mills, vice-president of quality assurance.

The company discovered there were three basic flaws related to its 3680 disk drives: in parts of the head disk assembly design, in the architecture of several printed circuit boards and in customer computer room environmental specifications that were stringent enough for traditional disk architecture but not for thin-film head technology.

See **THIN-FILM** page 47

Raimondi is a Computerworld senior writer.

Ridge to roll out high-end work group network server

By James Connolly

SANTA CLARA, Calif. — Ridge Computers Co. today is expected to announce a high-end system providing high availability while operating as a network server for scientific and engineering work groups.

Ridge's 3200 Model 90 system was designed to provide superminicomputer performance with a reported processing speed of 5 million instructions per second (MIPS).

The high-end 3200 Model 90 system supports more than 100 users on workstations from Digital Equipment Corp., Apollo Computer, Inc. and Sun Microsystems, Inc. and personal computers such as the IBM Personal Computer AT and RT Personal Computer and Apple Computer, Inc. Macintosh.

Includes high-availability features

The Model 90 reportedly includes high-availability features not found on earlier models of Ridge's reduced-instruction-set-computer-based systems. Components such as CPUs and disks are redundant. The system also features a microprocessor-based service processor that manages remote diagnostics.

Ridge President Vernon Anderson said the Model 90 was designed to reduce downtime and the delays associated with time-sharing systems and that it offers the power to perform computationally intensive tasks such as simulation, which many network servers do not perform.

Ridge claimed that the Model 90 operates at 5 MIPS for integer applications and performs 4.3 million single-precision Whetstone calculations per second and 2.4 million double-precision Whetstone calculations per second.

Features 128M bytes of memory

It also features a maximum memory of 128M bytes and a sustained I/O transfer rate of 18.3M byte/sec. in burst mode, according to the company.

According to Ridge, the basic configuration of the high-end system includes 4M bytes of memory, a 78M-byte hard disk drive, eight RS-232 ports and a cartridge tape backup and costs \$36,650.

A more typical configuration, the company said, includes 8M bytes of memory, eight RS-232 ports, the ability to expand to 32 ports and a 150M-byte disk drive. That configuration costs \$49,900.

Plexus system targets small offices

By David Bright

SAN JOSE, Calif. — Targeting small departments that may be cramped for space, Plexus Computers, Inc. has rolled out a 16-user, Unix-based desktop system.

Called the P/55, the entry-level, Motorola, Inc. MC68020-based system can be expanded to accommodate 32 users. Multiple P/55s can also be linked to form a local-area network.

Available now, the system is intended for small to medium-size businesses as well as departments in Fortune 2,000 corporations and government agencies. "The P/55 offers smaller offices expandability at a much lower price than the P/75 while re-

taining the benefits of speed, reliability and broad communications capabilities," said Kip Myers, vice-president of marketing. Prices for the P/55 begin at \$25,250, compared with \$36,000 for the larger P/75 system. The new system is software-compatible with the P/75.

In its minimum configuration, the P/55 has 1M byte of memory, a 72M-byte disk drive and a 60M-byte tape drive and can be expanded to include 8M bytes of memory, 435M bytes of disk storage and a Motorola 68881 floating-point coprocessor. A network of P/55s can be created with the addition of intelligent Ethernet controllers and Plexus' Network Operating System.

INSIDE

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Burroughs introduces a printer for the financial market/46

International Power Machines offers a convertible power supply for mainframes/46

NEW THIS WEEK

■ Houston Instruments offers plotters and digitizers

■ For more on this and other new products, see pp. 85-107.

INSTANT ANALYSIS

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SYSTEMS & PERIPHERALS

UPS maker offers 60Hz frequency conversion

By Stanley Gibson

DALLAS — While current mainframe computers, such as the IBM Series 3080 and 3090, require 400Hz power supplies, future computers may revert to the more common 60Hz frequency, according to International Power Machines Corp.

To cover that contingency, the Dallas-based maker of uninterruptible power supply (UPS) systems recently introduced a convertible frequency capability on its Endless Power UPS systems.

The enhanced Endless Power product can convert frequencies from 400Hz to 60Hz, and vice versa, maintaining a voltage tolerance of 1% with either frequency. In order to change the frequency, a service call of an hour or less is needed to exchange circuit boards and make some minor adjustments, according to an International Power Machines spokesman.

"Today's rapidly changing computer requirements mean that the data processing manager must have as much flexibility as possible. For example, his present IBM 4381, which operates on 60Hz, will be a 3081 or 3090 tomorrow and operate on 400Hz. And, who knows what the next generation will be?" said James deVenny, marketing vice-president at the firm.

"We're not predicting any-

thing. We're just making it possible to change," offered Lou Welt, marketing communications manager.

The new Endless Power systems, which are compatible with other Endless Power products, are priced from \$50,000 to \$65,000.

Jobs' Pixar ships image computer

By James Connolly

SAN RAFAEL, Calif. — Pixar has announced the shipment of its Pixar Image Computer to commercial and scientific accounts, three months after the company was acquired from Lucasfilm Ltd. by Apple Computer, Inc. founder Steven P. Jobs.

Pixar officials said the image computer is a high-per-

formance, general-purpose graphics computer. A key component of the \$122,000 system is its Chap channel processor, which uses a block-structured programming language and four parallel processors in a single-instruction, multiple-data architecture.

The company claims the processor performs 40 mil-

lion instructions per second. The system also has a 24M-byte, 2,000- by 2,000-pixel picture memory, expandable to 2,000 by 4,000 pixels.

In announcing shipments, Pixar said it has signed multimillion dollar OEM agreements with Symbolics, Inc. of Cambridge, Mass., and with Philips Medical Systems, Inc. of Shelton, Conn.

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Printer targets financial mart

By James Connolly

DETROIT — Burroughs Corp. has introduced a near-letter-quality printer designed to be shared by multiple workstations.

The EF 4560 Advanced Multifunction Printer is said to feature an automatic alignment system that properly positions a document no matter how it is placed on the transport belt.

The printer is targeted at the financial market because of its ability to handle a variety of document types such as deposit tickets, legal-size documents, passbooks, signature cards and business envelopes. It also can read and print optical character recognition documents.

It can be shared by two intelligent workstations, such as the Burroughs B25 and EF 7000, via two RS-232 ports or shared by multiple workstations under software control.

Available now, the EF 4560 printer has a base price of \$3,600.

SYSTEMS & PERIPHERALS

Thin-film woes aired

From page 45

The company focused its preliminary efforts on the head disk assembly. It discovered several flaws, including the fact that the lubricating film that sits on top of the disk was spinning off. The lubricant is supposed to reduce the heat and friction

that comes from the closeness of the head to the spinning disk.

The company made several fixes to its head disk assembly system by May 1985, and they incorporated the changes into their manufacturing process. For a while, all was well.

Then, in the summer of 1985, incidences of head disk interference increased again. Memorex claims that most of the incidents were caused by disks from its OEM supplier,

Data Media, Inc. Memorex severed its relationship with that company and replaced most customers' Data Media disks with Memorex disks, a company spokesman said.

Fixes lubrication problem

By the fall of 1985, Memorex had come up with a lubricant system that it says permanently fixed the lubricant-loss problem.

After all the hardware fixes, some customers continued to have problems

with head disk interference. Memorex, puzzled by the fact that the systems that came uniformly off its production line could act so differently at customer sites, started examining computer rooms.

The company found that the computer room environmental guidelines that worked a few years ago no longer provide the requisite safety for the new thin-film technology.

Memorex now urges customers to pay strict atten-

tion to staying well within vendor- and government-recommended guidelines for temperature, humidity and cleanliness. But customers may even have to go beyond those guidelines.

One key factor Memorex discovered is the importance of covering the computer room subfloor with an encapsulating paint to prevent minuscule particles of concrete dust from blowing in between the disk and head.

Memorex also found that computer rooms have hot spots, differing levels of humidity from one end of the room to another and minute particles of dust blowing in from air-conditioning systems.

The particles, which caused no problem with the traditional technology that kept the old ferrite heads flying 20 to 25 microinches above the disk, are a severe test of the new thin-film systems, in which the heads come as close as 11 microinches above the disk.

Initially reluctant to talk

At first, Memorex was a little reluctant to talk about its findings, one staff member said. The company was afraid it would look like only Memorex was experiencing these environmental problems; that IBM and the plug-compatible manufacturers were not.

But from *Computerworld* discussions with users of thin-film disk systems that came from different vendors, it appears the problems are universal.

Users who experienced mysterious head disk interference fixed the problem by renovating the computer room. Indeed, they found that painting the subfloor, correcting heat and humidity regulators so the room was evenly balanced and establishing a proper airflow virtually eliminated thin-film head disk problems.

It is a good day when a vendor comes out in the open with revelations of this nature. Memorex's confessions should enable thousands of MIS managers — not just Memorex customers — to avoid the headaches and the financial burden of living with head disk interference.

Now, wouldn't it be nice to hear from IBM and the other manufacturers about their experiences with thin-film technology?

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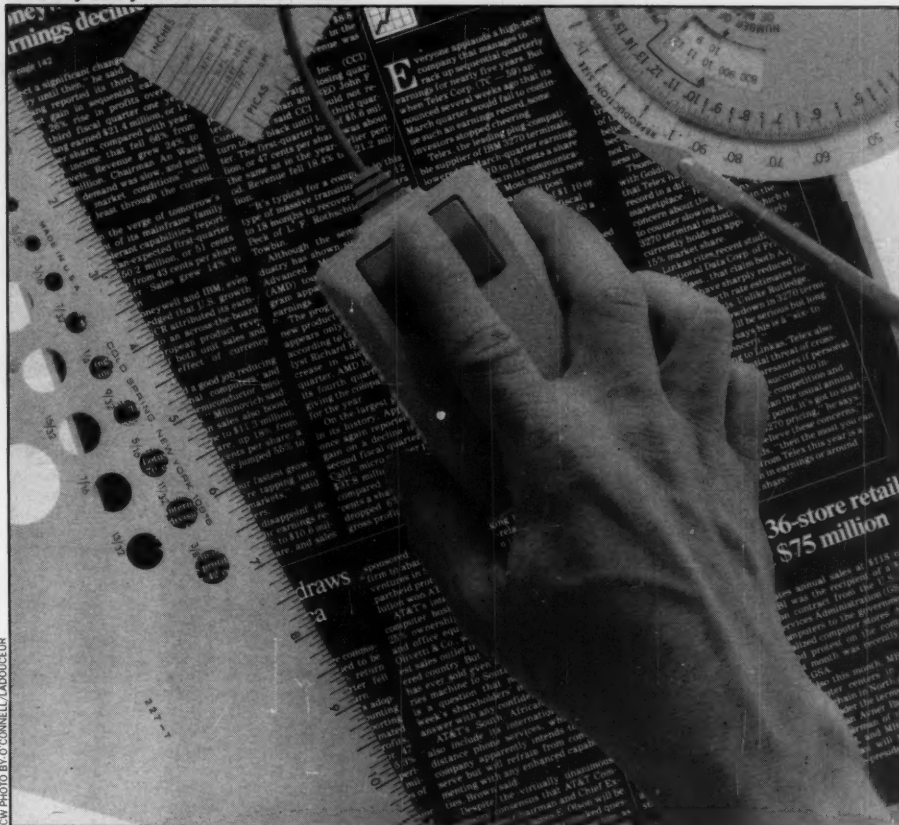
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Executive Report

Edited by Becky Batcha and Janet Fiderio



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Apple's Mac vs. IBM's PC: A debate on desktop options/55

Large-scale systems promise speedy performance, polished results/58

Single-user systems offer easy, inexpensive route into publishing/60

Current users give practical advice on getting started/62

In-house publishing

DP can prosper by tapping print systems' potential

By MICKEY WILLIAMSON

Computer-based publishing presents MIS managers with both tremendous opportunity and great challenge.

The opportunity is to take the lead in adopting an emerging technology that can show a striking impact on the bottom line. Without knowing much at all about the technology, companies can easily achieve a 30% annual return on investment, according to Paul Lewis, director of operations at Interconsult, Inc., a market research organization based in Cambridge, Mass. With good management, Lewis says, the annual return can reach 50% to 60%.

The challenge is to overcome traditional views of the MIS department and its managers, who often appear averse to innovation and uninterested in business beyond the collection and reporting of data. MIS managers often look at in-house publishing as a necessary evil, according to Keith Davidson, executive director of Xplor, an association for users and managers of advanced electron-

ic printing equipment. "You do printing to get the data out of the way of the mainframe so you can get back to processing data," he says.

But electronic publishing seems destined for glory, with the production of hard copy emerging as an integral part of information management. Most experts agree that those MIS managers who do not want to preside over the gradual erosion of their department's importance must start now to learn about computer-based publishing and introduce it to other people in their companies.

Davidson states the case forcefully: "I don't think MIS managers can afford to wait for management initiative if they intend to remain in the forefront of their company's requirements for managing information resources," he says. "I think they should lead the charge."

Electronic publishing is attracting considerable attention throughout the corporate hierarchy:

- Executive managers who want to minimize costs, cut document inventories and improve turn-around time are quick to see possibilities in computer-based publishing.
- Technical managers find it attractive because it meets a critical need for keeping proposals and technical documentation open to change.

Companies can save 50% and more if someone coordinates document production efforts. MIS managers seem well suited to the task.

Williamson is a technical journalist based in Warwick, Mass. She is the author of Artificial Intelligence for Microcomputers (Simon & Schuster, Inc., 1986).

MIS can tap print systems' potential

Continued from previous page

• People with personal computers on their desks hear about desktop laser printers and the software that drives them. If these users have not already done so, they are probably scheming to tuck funds for personal publishing capabilities into next year's operating budget.

All of these people will need advice and guidance in using their computers, and where better to get it than from the computer room?

Few companies know how much they spend to publish the forms, reports, brochures, proposals, catalogs, parts lists, instruction manuals, telephone directories and employee newsletters without which commerce would grind to a halt. This year, the expense will equal between 6% and 20% of gross corporate revenues. Increasingly each year, publishing is the second line of business for virtually every corporation.

Typically, funds for document preparation and production are spread among a dozen departmental budgets, controlled by a dozen managers, none of whom know what the others are doing. By pooling these efforts through a centralized electronic publishing system, companies can realize savings of 50% and more in their document production costs.

At Standard Motor Products, Inc. in Long Island City, N.Y., MIS manager Ashok Dudakia presides over a well-coordinated operation. Electronic typesetting machines draw directly on a corporate data base of thousands of automobile parts to produce polished catalogs and price sheets.

In the shop, clerks maintain the data base using Data General Corp.

10XP microcomputers and IBM Personal Computer XT's and AT's. A local-area network links the micros to two DG minicomputers, a disk storage device and a typesetting machine—Autologic, Inc.'s Micro V.

EIT, a software package from Electronic Information Technology, Inc. ties the auto parts data base to a data base of typesetting codes, thereby coordinating the two. "You can pull a field from the data base and automatically put in the codes you need," Dudakia says.

With the system, Dudakia's staff can automatically merge enough text elements to produce simple finished pages, a process known as pagination. More complex pages require some manual page pasteup.

The in-house electronic publishing operation lets Standard Motor keep its annual typesetting costs very low.

"If we went outside to typeset our catalogs, it would cost us about \$475,000 for everything that I'm doing," Dudakia says. "Doing it in-house costs \$215,000, including employee benefits."

Another user organization, Bank of the West in San Jose, Calif., has also taken advantage of electronic publishing to shave costs. Most of the bank's savings come not from bringing typesetting in-house but from automating previously manual design tasks and making revisions easier.

Bank of the West publishes 650 different forms and seven manuals for in-house use. Before the bank acquired an Interleaf, Inc. electronic publishing system in November 1984, it relied on manual pasteup, a highly labor-intensive process, for the production of the documents. Every time new banking laws and regulations forced changes in the forms' contents, the bank had to repeat the entire pasteup process, starting from scratch.

With electronic page makeup, legislative and regula-

tory changes pose less of a problem, according to Susan Mesches, a bank vice-president and manager of administrative services. Bank of the West can store the forms it creates electronically and recall them when necessary for quick, inexpensive on-screen revisions. Mesches estimates that the cost of producing proof pages has dropped by a third.

Bank of the West paid \$60,000 for the Interleaf system and expected full payoff within five years from savings of \$13,500 a year. At the end of the first year of operation, savings had already reached \$18,000, Mesches says.

Cost savings are not the only benefits. In-house electronic publishing lets a company take firm control over its document production. Publishing systems support on-demand printing, where a system produces only the number of documents needed at a particular time; in addition, they allow printing to take place at the last possible moment, to incorporate the latest information.

Computer-aided publishing also provides nearly effortless merging of text and graphics and allows companies to produce documents that look professionally typeset.

Graphics are becoming a necessity in business communications. Executive managers expect data to be accompanied by images, and assembly and repair manuals require a liberal sprinkling of illustrations in order to be effective.

Typeset text can be read faster and comprehended more easily than typewritten text or text produced on a matrix printer. The typeset page holds more words, making documents less bulky and, to complete the circle, saving money on paper and paper handling.

Beyond these organizational benefits, electronic publishing satisfies individual users' gnawing desire for creativity.

"Users want to express ideas," says Bernard Peuto, president of Concord Consulting in Menlo Park, Calif. "They want power and control."

These users, intent on their own performance, will not wait for long. Frank Yee, a salesman for Symbolics, Inc. in Los Angeles, is typical. Yee uses an Apple Computer, Inc. Macintosh and Laserwriter with Boston Software Publishers, Inc.'s Macpublisher II software to publish a new-product newsletter for his customers, gleaming the information from company memos. "If I didn't do it this way, I couldn't keep them up-to-date," he says.

Yee paid for the hardware and software out of his own pocket. "I'm just a guy who has a job that has to get done," he explains. "If I tried to do this through regular company channels, it wouldn't happen."

Yee's lament may seem familiar to anyone who sat in charge of MIS when personal computers started making their way into the corporate environment.

"I suspect that what will happen is basically the same thing as the way PCs and Macs sneaked in the doors," says Zach Deal, coordinator of electronic publishing at Harvard University's Office for Information Technology. "You'll have people bringing in fancy laser printers and doing more and more of their own publishing before the MIS managers have anything to say about it."

The personal computer experience of the past bears directly on today's electronic publishing experience, according to Andy Plata, president of Computer Output Printing, Inc., a service bureau based in Houston that consults in electronic printing.

"If not for the infiltration of PCs, most data processing managers would not even allow this to be discussed

Expert Advice

Don't wait for standards

After their experience in trying to get personal computers to communicate with each other and with the rest of the corporate computer system, MIS managers may worry about the widespread lack of standards in electronic publishing.

But they should not let that stop them from forging ahead, according to many experts. In the field of corporate electronic publishing, he who hesitates loses out.

"Wait for standards and you'll never get in," advises Toby Cobrin, president of Xplor, an electronic printing users' group, and vice-president of Comvestrix Corp., a service bureau in Lyndhurst, N.J. Cobrin feels strongly that the lack of standards should not deter companies from adopting the technology today.

Paul Lewis of the market research firm Interconsult, Inc. in Cambridge, Mass., agrees. "Whatever investment people make today will be well worth the buck, even though they may decide two or three years from now to make a complete change," Lewis says. "It's not a good idea financially and in many other respects simply to sit back and wait for things to happen."

Lewis does feel, however, that each company should be concerned with compatibility among its purchases. Unless every component in a publishing system uses the same codes for specific tasks, chaos is sure to result. Compatibility is a serious issue.

Alphanumeric characters present no problem; all computer-aided publishing systems understand standard ASCII code. But other elements can cause trouble:

- Formatting codes— for page headers and footers, centering, column alignment and so forth— vary from one vendor to another, and few of them work reliably together.

- Codes for describing the printed page to the printer also vary across systems. Xerox Corp.'s Interpress and Adobe Systems, Inc.'s Postscript are currently more popular than most page description languages. System vendors tend to support one or the other—not both.

- Disparate codes for storing and producing graphic images make matters worse.

Eventually, a couple of sets of standards will emerge, and integrating a system will be considerably less difficult, but standardization still lies at least three years away.

Zach Deal, coordinator of electronic publishing at Harvard University's Office for Information Technology, thinks that's too long. "If you wait for standards, you're talking about three years of lost possibilities," he says. "I would not be surprised if the cost of lost possibilities is greater than the cost of buying something now and having to buy something else a few years down the road. Besides, you get much further up the learning curve if you jump in now."

— MICKEY WILLIAMSON



“
The MIS guy has never given consideration to aesthetics. How he's going to change all of a sudden, I haven't the foggiest idea.
”

Thomas Dunn
Dunn Technology, Inc.



“
That's a good point. But it's just as valid to say the print shop should stay out because of the programming involved.
”

Keith Davidson
Xplor users' group

Continued on page 55

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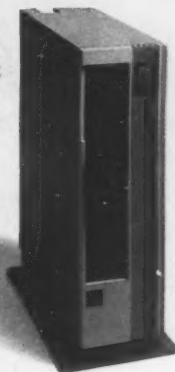
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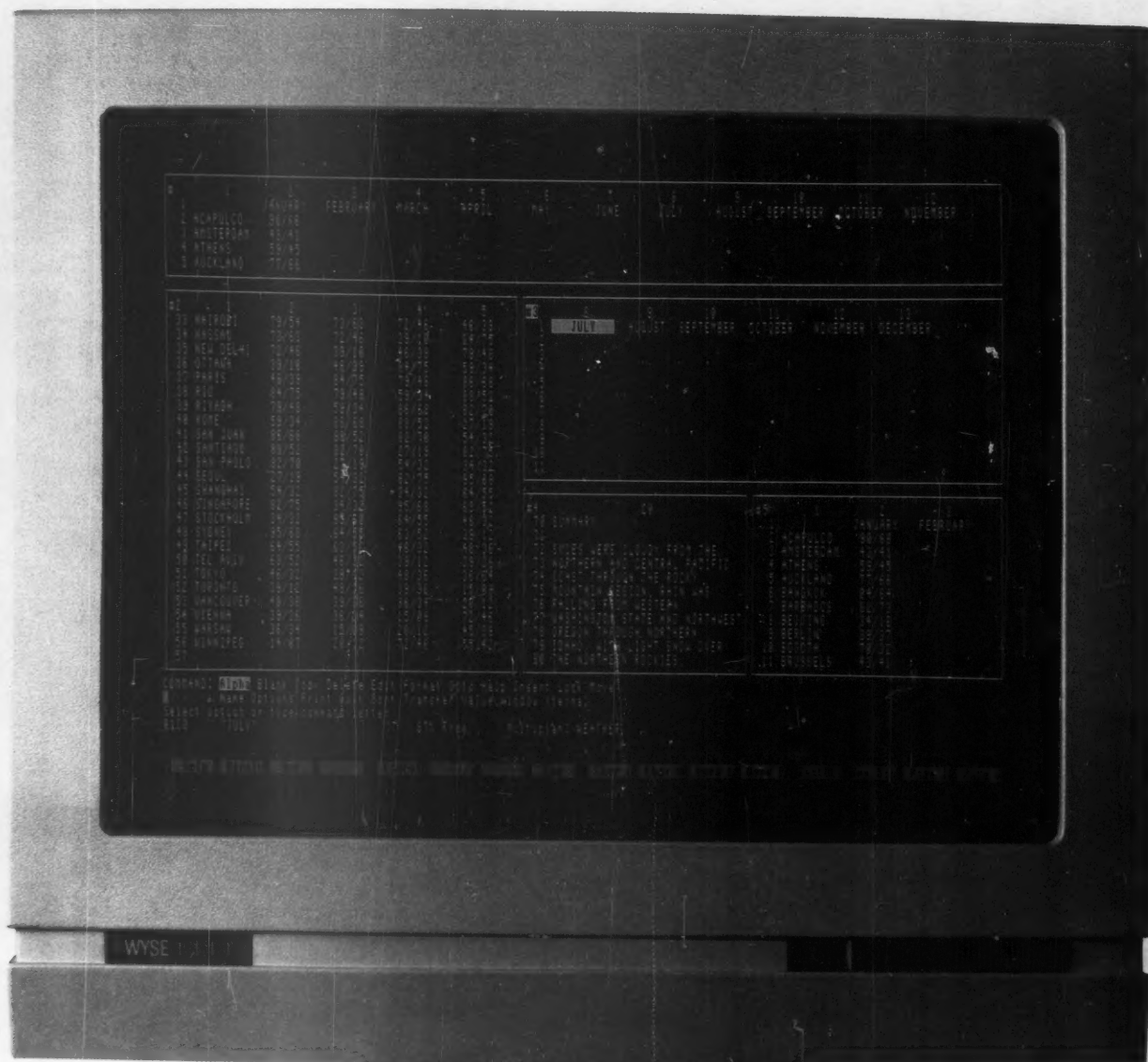
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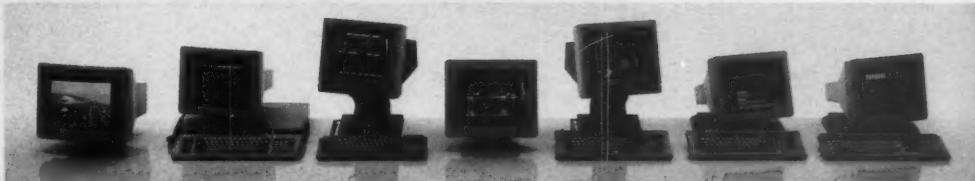
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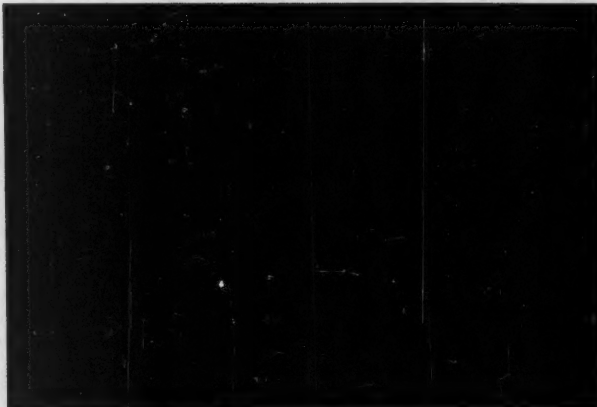
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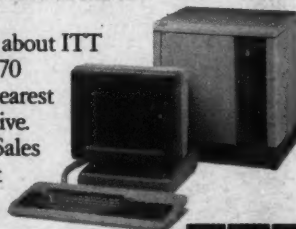
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around them," Plata says. "Today, they realize that unless they do get involved in figuring out how to use this equipment and integrate it, people will have stand-alone systems in their offices."

Indeed, Plata tells of one company in which five laser printers do the work that one could handle because the DP department refused to step in and manage.

Xplor's Davidson thinks there is a lesson to be learned from the advent of personal computers. "I believe that the proliferation of PCs in most corporations probably exceeded management's best judgments about how it should have been done — that there are too many of them and too

many different types," he says. "If they had it to do over again, most corporations would try to be more consistent."

Davidson recommends that MIS managers coordinate the acquisition of electronic publishing equipment with an eye toward users' needs, paying careful attention to the requirements of each operating department.

□ □

A four-step plan for decisive action

Another relevant lesson from the history of the corporate PC is that

MIS managers who do not get involved in the adoption of new technology get bypassed as the technology takes hold. MIS managers need to recognize computer-based publishing as a mainstream information processing technology and approach it as such.

Getting involved in the implementation of an electronic publishing system means taking a number of actions right away:

Step 1. Find out how the company currently publishes its documents.

The manager who seeks to implement an in-house electronic publishing system needs to know exactly how his firm's document production works right now. To find out, he

should ask the following questions:

- What documents are being published, by what departments, in what quantities and through what processes?
- Where do each document's text, data and graphics components originate?
- How do the various components get incorporated into the document?
- What are the costs in labor and materials?
- Are documents printed within a centralized in-plant print shop, on departmental laser printers, at a commercial printer or service bureau or in a variety of locations?
- How long are lead times for printing documents?

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Debate

What micro should MIS sanction for desktop publishing?

IBM's PC:
Use what you've got

By ARLENE KARSH

Apple Computer, Inc.'s Macintosh holds an early lead in the desktop publishing race, but the IBM Personal Computer keeps gaining ground. And, in spite of its bad rap as a nongraphic, nonaesthetic, data-driven box, the PC will ultimately emerge as the winner.

Whereas Apple pioneered desktop publishing as a specialized application for graphics designers, its real potential lies in the broader office and business market. In this market, the IBM Personal Computer is already the workstation of choice.

Millions of PCs and compatibles operate in American businesses. Common sense dictates against bringing in additional hardware dedicated exclusively to creating documents. Moreover, vendors are devoting considerable energy and money to ensuring that the mainstay of the business community adapts to the rigors of producing aesthetically appealing documents.

Recent developments in operating environments, page composition software and peripherals give the IBM PC the highly graphic, interactive, user-friendly attributes associated with the Mac — all de facto requirements for page composition.

• **Operating environments.** Products like Windows from Microsoft Corp., Topview from IBM and Graphics Environment Manager from Digital Research, Inc. provide the IBM PC with multiple on-screen windows, pull-down menus, pointing devices and zoom and pan capabilities. These features all come in handy for integrating and viewing the many text and graphics images required for page composition.

• **Page composition software.** Many of the major suppliers of Mac-

intosh desktop publishing programs are expected to release IBM PC versions within the year. Other software developers, including Ventura Software, Inc., T/Maker Corp. and Bestinfo, Inc., have already displayed impressive preview versions of easy-to-use page composition programs for the PC; these programs should ship soon.

Established publishers of IBM Personal Computer software like Microsoft, Micropo International Corp. and Lotus Development Corp. also seem poised to enter the PC-based desktop publishing arena.



• **Peripherals.** Page description languages allow PC software to produce full-page text and graphics output on a wide variety of printers, including the highly touted Apple Laserwriter. And software packages from vendors like Bitstream, Inc. and Compugraphic Corp. give Personal Computer users access to many typographic fonts that provide professional hard-copy output, despite the standard PC's relatively poor screen resolution.

The PC's open architecture encourages these and other efforts and will allow the machine to expand as a publishing system. Thanks to its ubiquitous presence in business and vendors' intent to keep it that way, the PC will flourish as a platform for office desktop publishing.

The real contest, in fact, is not between the Macintosh and the PC. Rather, it involves the many emerging vendors that hope to provide the most successful desktop publishing solutions for the IBM PC.

Apple's Mac:
Use what works

By JAMES CAVUOTO

Corporate edicts that say "Buy IBM" have thwarted many would-be in-house publishers. Apparently, some DP managers feel that the desire for the graphics interface afforded by the Apple Computer, Inc. Macintosh's mouse and pop-down menus is nothing more



than an affectation.

This attitude is counterproductive — and unprofitable — for American business. If a company wants to accomplish its goals, it needs to use tools that work. And as matters stand right now, those tools are the Apple Macintosh and Laserwriter and associated page layout software packages.

The Apple system works right now. It works better than any other option. And it works for the lowest amount of money.

The Macintosh's design makes it the most appropriate personal computer for publishing applications. The machine features a high-resolution graphics display and internal support for multiple type fonts and sizes. It offers a consistent and easy-

to-use mouse interface, and it runs on a high-performance Motorola, Inc. 68000 processor.

In contrast, the IBM Personal Computer supplies only an 80-column, monospaced display. Its character set is missing several important publishing symbols such as the em dash (—) and bullet (•). And it lacks a standard graphics display and printing environment — factors that impede software development.

Admittedly, several IBM PC-based programs under development promise much of the performance of a Mac. But six to 12 months will pass before these programs are readily available and debugged.

In the meantime, many users can easily save the cost of a Macintosh (about \$2,000) by using it to produce documents that would otherwise require expenditures for typesetting, graphic design, revisions and reproduction. Even if better software for the IBM PC arrives a year from now and a company needs to throw away its Macintosh, the machine's temporary use would be cost-justified.

Companies cannot write off the \$6,000 Laserwriter printer as quickly, but they have no pressing need to do so: It will not be a candidate for the garbage can for quite some time. No matter which microcomputer it supports — the Macintosh or the IBM PC — it is now and will continue to be the best laser printer available for desktop publishing.

Because of the powerful and flexible Postscript language from Adobe Systems, Inc. built into the printer, many software packages for the IBM Personal Computer — including Microsoft Corp.'s Microsoft Word, Ventura Software, Inc.'s Ventura Publisher, Studio Software Corp.'s Do-It and Bestinfo, Inc.'s Superpage — will support the Laserwriter without any modification.

But these are future concerns. For now, the bottom line should serve as the guiding force in office publishing. Users of desktop publishing systems and the managers that oversee purchases should concern themselves with supplying a cost-effective solution, not with satisfying corporate requirements for standardization.

Karsh is director of the Computer Publishing Systems Market Requirements Service at C. A. Pesko Associates, Inc. in Marshfield, Mass.

Cavuoto is editor and publisher of "Micropublishing Report," a monthly newsletter. He works out of Redondo Beach, Calif.

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From the answers, the manager can uncover inefficiencies and determine exactly what benefits might accrue from the relatively inexpensive, on-demand print capabilities that an in-house system provides.

At this stage, the manager should also seek the answer to one highly strategic question: If publishing operations are already distributed throughout the company, is it too late to coordinate them?

Step 2. Learn as much as possible about electronic publishing technology and techniques.

To use the information he gathers in the first step, the manager needs to find out how electronic publishing systems work and how they can improve his firm's operations.

He should read enough magazines,

newsletters and books to gain familiarity with the terminology and trends in document design and production, and he should explore vendor literature as well.

Lest all this study remain in the abstract, the manager should sit down in front of a personal computer and work with a desktop publishing package. "Education is the most important thing," says Standard Motor's Dudakia. "Get it on your desk and learn, and you'll be way ahead of the game."

The process of self-education should run parallel to the fact-finding mission so the manager can get through both steps as soon as possible and move on to more concrete action.

Step 3. Seek preliminary support from upper management.

Armed with some knowledge of the company's needs and of solutions currently available in the marketplace, MIS can approach management with a recommendation that a task force be formed for further exploration of electronic publishing.

The group should draw members from every department that holds an interest in producing readable documents. Discussions should focus on determining what documents the company produces and meeting the needs of the people who produce them.

Once task force members agree on what they want, they should draw up a wish list for a corporate publishing system, leaving nothing out. They can then call in the vendors to find out what the company can reasonably accomplish with an expendi-

ture that will pay for itself within three years.

Step 4. Establish MIS as the coordinator of system installation.

If the MIS manager follows the first three steps, he should be able to convince top management of his ability to handle the business and technical considerations of corporate electronic publishing. With management's sanction, he can position MIS to lead the charge.

If he cannot sell corporate executives on his shop's abilities, management may assign the task of installation and integration to someone less capable, and the system may fail miserably.

The experience of one military contractor is instructive. The contractor in question tried, without success, to integrate its text and graphics publishing capabilities. Two members of its electronic publishing task force told the firm's story on condition that no names be used.

The company makes military equipment — machines with as many as 20,000 parts, requiring operations and service manuals that are 5,000 pages long. Employees from a variety of departments contribute to production:

- Writers and editors in the technical publications department produce text on Wang Laboratories, Inc. word processors.
- Engineers and technical illustrators use computer-aided design and manufacturing (CAD/CAM) systems to produce some drawings, but they draw highly complex designs by hand. (One of the major benefits of the firm's proposed computer-aided publishing system was the ability to scan these drawings digitally into the engineering data base.)

• The copy center and reprograph-

Continued on page 58

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What to seek in software

To a great extent, software determines the visual quality of electronically published documents and the ease with which they are produced.

Publishing software should allow the person responsible for the document to see what each page will look like before it is printed, a phenomenon known as WYSIWYG (pronounced wizzy-wig): What you see is what you get.

Generally, good publishing software should meet four other criteria as well:

- It should allow users to arrange text in columns and insert graphic images.
- Material should flow automatically from one column to the next or from one page to the next when editorial changes are made.
- Footnotes should stay on the same page as the text to which they relate.
- When the user moves a figure from one place to another, the software should automatically renumber both the figure and all references to it in the text.

— MICKEY WILLIAMSON

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IBM Personal Printers...The Finishing Touch.

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ics department takes camera-ready copy and produces finished documents.

• The office automation department has budgetary responsibility for equipment used by the engineering and technical publications departments.

When the firm started its project to integrate text and graphics production, it formed a task force that included people from all relevant departments. Initially, the members felt eager to cooperate and share resources. Unfortunately, future events wrecked the team spirit.

"When we presented the project to management, it was too complex for them to understand. They couldn't tell which pieces represented the most benefit for the busi-

ness," says one member of the task force. "They asked for it to be taken apart, so we unbundled it and presented it a piece at a time."

As the task force prepared the revised presentation, members from the various departments became reluctant to give up control. Before long, an interdepartmental struggle arose over who would integrate the system. Despite the objections of both the MIS and office automation departments, the struggle ended in the selection of a vendor that lacked the requisite know-how.

As a result, text and graphics for manuals and proposals are still being produced separately and pasted up by hand to produce camera-ready pages.

Sadder and wiser, the company will eventually integrate text and

graphics. But implementation will come slowly. "It's going to take some sensitivity and awareness, which now we have," one participant says.

Making the case for the MIS manager as czar

Computer-based publishing draws from a variety of disciplines. Word processing, data processing, applications development, graphic design and printing all come into play in the production of almost any corporate document. Other functions, such as telecommunications and CAD/CAM, may also get involved.

Among operating departments,

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The high end: Performance, sophistication

By BARBARA MCLEAN and BERNARD PEUTO

No one electronic publishing system can handle all of a typical Fortune 1,000 company's publications. As a consequence, there are a variety of electronic publishing systems being used for those tasks:

- Low-end, single-user desktop publishing systems effectively produce shorter newsletters and reports (see story page 60).
- Mid-range systems process long documents but with limited typographic quality. These systems most often work well where office automation systems are used today.
- High-end systems produce sophisticated documents of unlimited length, composition or typographic quality. High-end systems work well in companies in which the internal publishing group already has a typesetter.

Where mid-range and high-end systems differ from desktop publishing systems is in their ability to offer multiuser facilities to corporate professional publishing groups of three or more people. The primary distinction between mid- and high-range systems is their level of pagination sophistication. A high level of pagination sophistication usually indicates an accompanying high level of typographic sophistication.

Mid-range systems. The cost to configure a mid-range system that includes a workstation, usually an IBM Personal Computer AT or equivalent, with laser printer and all software is between \$15,000 and \$25,000. By replicating the workstation and adding a network, these systems can support four to six people.

In this work group environment, some of the workers will use standard word processors to generate text. Someone will be using a drawing package, and the graphic artist in the group will be using a page make-up program. All software will be running on personal computers.

These systems are ideal for mid-size documents of 20 to 100 pages with fixed formats that can be stored as style sheets (formats for each type of page) and for a batch pagination approach, where the entire document is composed according to a set of predefined rules and commands.

Mid-range systems typically support low-resolution graphics because of the low-resolution (200 by 200 to 300 by 300 dot/in.) scanners and laser printers that they support.

Graphics most often must be fixed—that is, assigned to a specific area on the page—unlike high-end systems, which permit graphics to float

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McLean and Peuto are the founders of Concord Consulting, a Menlo Park, Calif.-based consultancy that specializes in the computer-aided publishing industry.

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along with text from page to page during the pagination process. Typography sophistication is usually limited to the capability of the laser printer.

Justification (right, left and center) is supported, accompanied by hyphenation based on a dictionary. Widow and orphan control is supported, as are running heads and footers. Some systems support automatic tables of contents.

As far as hardware is concerned, the distinction between high-end desktop systems and workstation systems is blurring now that personal computers are increasing in performance and workstations such as Sun Microsystems, Inc.'s recently released line are dropping in price.

The mid-range options include both of these desktop or workstation platforms. Enhanced PC AT Microsoft Corp. MS-DOS-based systems include Digital Composition Systems, Inc. and Corporate Data Sciences, Inc. offerings. Both provide bundled turnkey systems.

Basic system pricing for mid-range systems, including a workstation, laser printer and software, are as follows:

Corporate Data Sciences is currently the cheapest with its \$7,000 to \$13,000 price tags. Amgraf, Inc. offers a Unix-based system in the \$9,000 to \$16,000 range. NBI, Inc. provides its entry-level systems at \$13,000 to \$16,000. Digital Composition Systems bundles its system with a Datacopy Corp. scanner for \$23,000.

One can also buy a Sun Microsystems workstation or an IBM RT Personal Computer with Interleaf, Inc.'s Workstation Publishing Software for less than \$25,000.

Options for these mid-range systems include low-resolution scanners from vendors such as Dest Corp., with PC Scan (\$2,000); Microtek Labs, Inc., with MS-200 or MS-300 (\$2,500); and Datacopy, with Model 620 (\$14,950), Model 700 (\$3,940) or the just-introduced Jetreader, which sells for \$2,900.

Other options include laser printers from Hewlett-Packard Co., namely the Laserjet (\$4,000) and the Laserjet Plus (\$5,000), and Apple Computer, Inc.'s Laserwriter (\$6,000 to \$7,000).

Interfaces to computer-aided design systems like Autodesk, Inc.'s Autocad cost between \$2,500 and \$5,000, depending on which exchange format is to be used.

Typesetter interfaces cost between \$2,500 and \$6,000, depending on the typesetter and font requirements. Typesetters range from \$9,000 (Compugraphic Corp.) to \$30,000 (Linotype Co., Itek Corp. and AM International, Inc.'s Verityper).

High-end systems. At the high end, systems are not limited in performance and sophistication. They support long documents of hundreds of pages and usually require a Sun Microsystems-like bit-mapped workstation.

In addition, these systems typically offer both batch pagination and interactive page makeup, with features that include all those found in mid-range systems and additional ones such as vertical justification, side notes, straddle drawings and text, text runarounds, floating drawings and tables, automatic tables of contents and indexes, overflow

pages, automatic numbering of lists and section heads, annotations, change bars and listing of changed pages.

A few of these high-end systems are beginning to feature data base management facilities. These include products from Caddex Corp., which offers a Digital Equipment Corp.-based system for three users that costs \$100,000; Context Corp. (the offspring of Mentor Graphics Corp.), which sells an Apollo Computer, Inc.-based system with Apollo's Domain, serving up to 12 users (a three-user system costs around \$100,000); and Intergraph Corp., offering a DEC VAX-based system priced at a minimum of \$120,000.

All of these vendors have technical roots and are pursuing markets such as aerospace technical manuals.

These are the systems that are most likely to offer the automated changed-pages features so important to often-revised documents such as product manuals.

Others offering high-end systems that integrate graphics and offer typographic and pagination sophistication include the following companies: The Datalogics Corp. 6300 (\$140,000), The Eastman Kodak Co. Kodak Ektaprint Electronic Publishing System (\$35,000) and Interleaf's Technical Publishing Software system (\$30,000). These prices are for typical entry-level workstations, laser printers and software.

In addition, the following companies offer products in the price ranges listed: Penta Systems International, Inc. (\$50,000), Textet Corp. (\$55,000), Viewtech Corp. (\$50,000),

Xerox Corp. (\$90,000) and Xyvision, Inc. (\$60,000). Add-on workstations generally cost \$15,000 to \$50,000.

The options for these systems include all the laser printers listed above as well as high-resolution laser printers from Data Recording Systems, Inc. and Tegra, Inc., which sell for about \$35,000.

High-resolution scanners and scanning systems at the 1,000 by 1,000 dot/in. level are available from Imagitex, Inc. (\$25,000 to \$170,000), ECRM (\$50,000), Eikonix Corp. (\$35,000 to \$45,000), Compugraphic (\$60,000) and Autologic, Inc. (\$60,000 to \$150,000). Extremely sophisticated products are available from Information International Co. and Hell Graphics Systems, Inc. These products are priced between \$150,000 and \$250,000.

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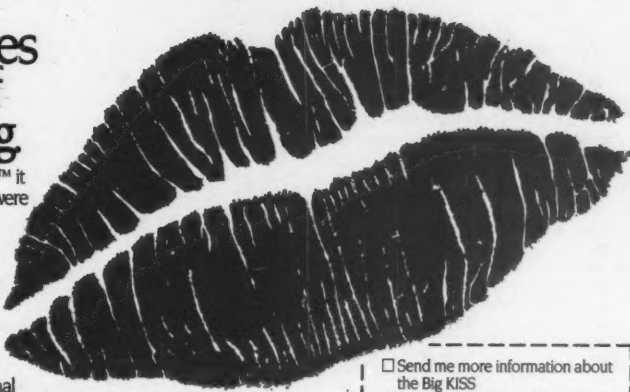
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Continued from page 58

marketing, sales, engineering, investor relations, employee relations, technical publications, finance and others have a stake in the way in which documents are created and produced. Each may think it should control its own publishing projects, either by setting the standards in equipment and format that all others should follow or by disregarding what is going on in the rest of the company.

There is no formula for deciding who will take the lead in developing a coherent approach to computer-based publishing. But someone needs to coordinate corporate efforts, and MIS managers seem well suited to the task.

"They usually already have the prestige and power in the corporation and the necessary kind of budget, so they can make things happen more easily than people who manage other functions," says Xplor's Davidson.

Interconsult's Lewis backs him up. Where issues of data management, integration and new technologies are concerned, "MIS people are right smack dab in the middle of what's going on," Lewis says. "MIS is the logical choice for computer-based publishing because it's an integrating process."

Arlene Karsh, who directs the computer publishing systems market requirements service at C. A. Pesko Associates, Inc. in Marshfield, Mass., looks at the issue from another angle. According to her, MIS managers need to get involved "if they want to continue to be the czar of information handling."

"Especially where you have lots of central control and authority within the MIS area, it makes sense to get involved," she says. "It's going to come in through the back door, anyway."

The growing decentralization of document publishing is likely to put pressure on the MIS function in direct proportion to the amount of control the department has had in the past on how data looked coming into and going out of the corporate mainframe.

Whether MIS will be able to maintain control depends to a great degree on how well managers can overcome the traditional view of their abilities and attitudes.

Thomas Dunn, president of Dunn Technology, Inc. in Vista, Calif., and publisher of the "Dunn Report" on electronic publishing systems, is one who doubts that MIS can play a significant role in corporate publishing.

"The MIS guy has hardly ever been related to any product that somebody liked," Dunn says. "He has never given any consideration to the aesthetic quality of his data. How he's going to change all of a sudden, I haven't the foggiest idea."

Confronted with that argument, Davidson, whose organization's membership is drawn largely from MIS departments, replies, "I suppose that's a good point. But it's just as valid to say the print shop should stay out because of the programming involved, and the office manager ought to stay out because he doesn't know anything about either one. So nobody should do it."

"There isn't anybody prepared to do this," Davidson adds. "Traditional backgrounds and capabilities make no one qualified, and all of them have to be."

Desktop publishing: Easy, inexpensive

By RICHARD SHAFFER

Assembling an appropriate desktop publishing system requires finding three components — page composition software, a laser printer and a personal computer — and pulling them together.

Page composition software packages. These programs resemble word processing packages in that they let

Shaffer is editor and publisher of "Technologic Computer Letter," a weekly newsletter published by Technologic Partners of New York.

a user create and edit text, but they were designed primarily to make it easy to merge text and graphics on the computer screen. Text that has been created with word processing software can be combined electronically with artwork that has been generated with a drafting package or input with a scanner or digitizer.

The process requires no cutting, pasting, razor blades, wax machine or paste pot. Moreover, users can resize, scale and crop drawings and can format text and make it flow around artwork — all tricks that used to require the services of skilled graphics artists and typesetters.

Software packages fit into two

categories: those that run on the Apple Computer, Inc. Macintosh and those that run on IBM Personal Computers and compatibles.

The three most popular packages for the Macintosh are MacPublisher II from Boston Software Publishers, Inc. (\$195), Ready-Set-Go from Manhattan Graphics Corp. (\$195) and Pagemaker from Aldus Corp. (\$495).

On the IBM Personal Computer, the software choices are primarily Do-It from Studio Software Corp. (\$1,895) and Microsoft Word from Microsoft Corp. (\$195), but the selection keeps widening. T/Maker Co. just started shipping Personal Publisher, a \$195 program, and Xerox

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Corp. will start marketing a \$695 program from Ventura Software, Inc. sometime down the road.

Software Publishing Corp., well known for its PFS series of personal computer software, is also coming out with a \$495 program, Superpage, which the firm is remarketing for Bestinfo, Inc.

Page composition software packages' capabilities vary widely. Microsoft Word, for example, will format text into columns, but the columns will not run side by side on the screen. And although the package can incorporate charts into the text, it cannot merge picture or line drawings. Do-It will accept line drawings but not digitized pictures.

Laser printers. The most important requirement for a printer is that it work with the composition soft-

ware the user wants to buy. Composition software works just fine with even a dot matrix printer, but this rudimentary configuration misses the point of elegant output. Most office users will want a laser printer.

Any laser printer will do desktop publishing, but some are more equal than others. A user's choice will depend primarily on the amount of line art or other graphics he wants.

At 300 dot/in. (the standard resolution of laser printers), a printer requires about 1M byte of memory to digitize an 8½- by 11-in. page. A laser printer with less than 1M byte of memory cannot print an arbitrary shape anywhere on the page.

The standard Hewlett-Packard Co. Laserjet, for example, supports full-resolution graphics, but only on a quarter of a page. The Laserjet Plus

supports full-page graphics, but only at a resolution of about 150 dot/in.

These capabilities make the Laserjet adequate for simple jobs, but more complex documents require an Apple Laserwriter. The Laserwriter not only has more memory but also features greater microprocessing power than the Laserjet.

The standard HP Laserjet sells for about \$3,000; the high-end version costs about \$4,000. The Apple Laserwriter lists for \$5,999, but it can be acquired for about \$4,800. The Laserwriter Plus, which provides more type styles, costs \$800 more.

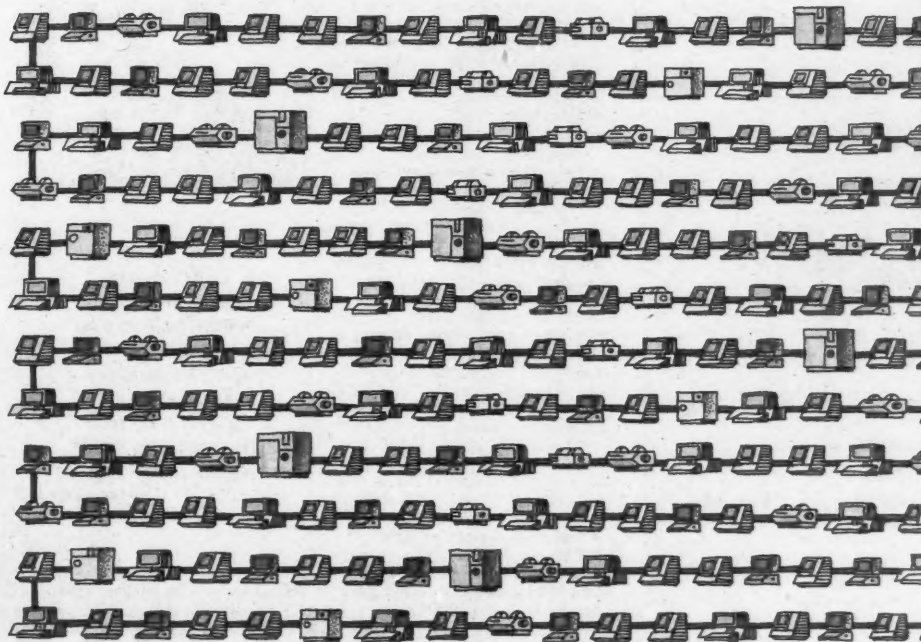
Personal computers. The Apple Macintosh features the well-known benefits of being easy to learn and use. In addition, what you see on the screen of the Macintosh is generally much closer to what you get out of

the printer compared with what is viewed on the screen of an IBM PC or compatible. But although the IBM PC is currently limited in its desktop publishing powers, it can drive the Apple Laserwriter.

If a company decides to go with Apple for desktop publishing, it may want to consider buying a Macintosh Plus rather than a basic Mac. Some composition programs work with a single-drive, 512K-byte machine, but for documents longer than a few pages, disk swapping gets to be an irritation.

Complex work requires a bigger machine. Any user department in which bills for typesetting, transparencies or other graphic arts services run above \$500 a month should be able to justify the price of a double-drive Macintosh Plus quite easily. ■

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Beware of system shortcomings

The desktop publishing process seems so simple and appealing that a few caveats are in order, especially if one expects to gain corporate achievement rather than personal amusement.

First, to say that \$10,000 desktop publishing systems perform like \$100,000 commercial-grade publishing systems is to engage in the sort of hyperbole that has caused so many consumers to dismiss all claims about personal computers as so much malarky.

Most desktop publishing systems resemble cheap guitars: Almost anyone can quickly learn to do something simple and pleasing with them, but making real music still takes talent. And, for the experts, the instruments are much too limited.

One shortcoming is that desktop publishing systems usually lack full-page displays. On most systems, the screen does not display the text as it actually will be printed.

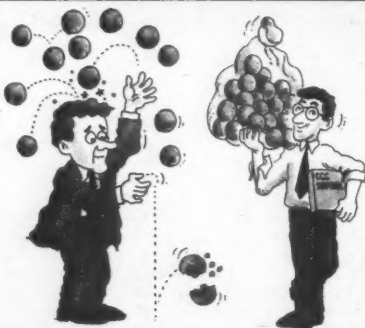
Moreover, some systems still require users to master tricky codes, and most still have a rudimentary networking capacity.

Compared with professional publishing systems, desktop versions are agonizingly slow. And they tend to permit only the most limited use of images from scanning machines. Layout can take hours, especially for beginners.

Also, electronic page layout will have the same double-edged effect on corporate users that computerization of the newsroom had on reporters and editors. Certainly, it will provide more control over the creative process, but it will also transfer low-paid clerical jobs (typesetting and proofreading, in the case of newspapers) to more highly paid, nonclerical workers.

Like word processing equipment, desktop publishing equipment will also permit — even encourage — professionals to spend a lot of time redoing their work and perfecting its appearance. One has to ask whether that is really an increase in productivity.

— RICHARD SHAFFER



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Survey

How to choose your first in-house publishing system

Users offer advice on getting started

By EDDY GOLDBERG

The purchase of an in-house electronic publishing system can be likened to the purchase of any other computer system — with one major difference. The comparative newness of publishing systems has left potential buyers confused.

Advice from current users who have implemented electronic publishing solutions — ranging from desktop to mainframe — can help those considering a system.

• **Define your needs.** Publishing requirements vary greatly from one company to the next. Where an Apple Computer, Inc. Macintosh may be more than adequate for one company, an IBM mainframe may be needed in another.

Who reads the output will determine whether a 300 dot/in. laser printer or a four-color press producing typeset-quality documents is appropriate. The level of computer expertise, ranging from highly trained DP personnel to writers who refuse to learn format codes and commands, determines what kind of front end the system should have.

• **Consider a mainframe solution.** When considering automating the publishing function, Pete Murphy, second vice-president in the DP department at the Travelers Insurance Co. in Hartford, Conn., recommends looking at the "big picture."

At Travelers, the vast store of data used in printing insurance policies resides on the company's mainframe. Not counting field offices, Murphy estimates that about 20 million pages a month fly off eight IBM 3800 laser printers, each of which puts out 215 pages every minute.

"It's very natural to meld the two technologies of DP and printing," he says. "With 300 million instructions per second of computer power in the data center, it would be foolish for us to go down separate paths."

Murphy says that although both the cost and associated risk of buying a desktop-based publishing system are small, so is the return.

"There are a lot of companies like us," he says. "With large volumes of publishing, the payoff is greater with a larger capital investment. The place you have the big payoff is where the printing and data processing are compatible."

• **Use multiple solutions.** According to Vijay Mohan, manager of electronic publishing at J. C. Penney Communications, Inc. in New York, desktop publishing systems can complement conventional installed systems.

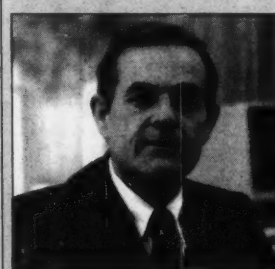
"We have both conventional photo-

typesetting capability and in-house laser output," he says. "My reason for getting the desktop publishing system is that it complements, not substitutes for, typesetting."

Mohan's operation uses Eastman Kodak Co.'s Kodak Ektaprint Electronic Publishing System (KEEPS) for internal documentation that includes manuals, forms and bulletins.

For work requiring phototypeset output, he has a separate Atex, Inc. system. Keyboarding, editing and page composition is done in-house, but the phototypesetting output is performed by off-site vendors via 9.6K bit/sec. modems. "The desktop system is not for refined work," he says.

• **Involve everybody.** Bringing in as many people as possible throughout the decision-making process is



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'Make sure everybody in the organization who has any influence sees the product. Start with the users, who tell their bosses, until it gets to the top.'

— David Becker
Boeing Aerospace Co.

critical, says David Becker, automation manager for Boeing Aerospace Co.'s Graphics Electronics Publishing Project. During an exhaustive examination of publishing needs undertaken about three years ago at the Seattle company, user input and technical expertise provided by Boeing Computer Services Co. played a key role in the adoption of a new system.

Becker coordinated the search and arranged for the demonstration in early 1984 of an early version of Interleaf, Inc.'s workstation-based publishing software, once he determined the product had potential for Boeing Aerospace's 230 graphic artists. Although he encountered some internal resistance to dealing with a small start-up company with a new

Goldberg is a Computerworld senior writer.

Executive Report/In-House Publishing

product and an uncertain future, the demonstration was a key factor in selling the system inside Boeing.

"Make sure everybody in the organization who has any influence sees the product. Start with the users, who tell their bosses, until it gets to the top," he suggests. Becker adds that it helped a great deal when the president of Boeing saw and liked the Interleaf system.

• **Solicit user input.** Bob DeFord, manager of technical documentation at John Fluke Manufacturing Co. in Everett, Wash., is the first customer for the technical publishing system offered by Caddex Corp. of Woodinville, Wash. He underscored the value of involving the users in the purchasing decision. "It's important to work with your people. A lot of the success or failure with an automated publishing system comes from involving them."

DeFord claims that managers do not always attempt to understand the user's viewpoint or look at the impact that these systems will have on departmental culture. "Most managers ignore this and get hit

• **Fit the system to the users.**

Johnson also wanted a system that was responsive to nontechnical users. "Ease of use by the operators translates into productivity," he says. "I wanted a software program that would insulate the people from whatever the machine was doing. Non-computer types tend to be less forgiving. They won't understand why a machine is slow and will lose interest if a machine is not responsive."

• **Don't overbuy.** Michael Bosniak, manager of reprographics at NBC in New York, cautions against buying systems that are too sophisticated for typical corporate users.

"Some systems are quite sophisticated and could solve every one of our needs. Unfortunately, they are designed for heavy production. It's possible that these systems are too sophisticated and too costly for the in-plant or corporate market," Bosniak warns.

After testing a number of solutions, Bosniak decided to use a Compugraphic Corp. Powerview 8600 system for high-quality text output and a Kodak KEEPS system for graphic output that includes charts and graphs. He plans to hook the Compugraphic and Kodak systems together in the future.

• **Choose open architectures.** Choosing a single vendor with a dedicated proprietary system may not only inhibit multivendor connectivity but may prevent a company from taking advantage of a still-evolving technology, says Boeing Aerospace's Becker.

"In other words," he adds, "favor open architecture implementations that adhere to or that are compatible with de facto, industrial, national and international standards."

• **Investigate start-ups before you invest.** Although most users recommend going with an established company that has a proven product, there can be advantages to getting involved with a smaller company still developing its product. In short, you get a bigger vote.

If you do bet your money, and perhaps your job, on a small, promising company, be sure to thoroughly investigate its management and financing. Above all, visit and talk to its users.

In late 1983, David Tamminen, manager of printing services at Union Mutual Life Insurance Co. in Portland, Maine, was one of the first customers of Xyvision, Inc. of Wakefield, Mass. "I went with a new company at its beginning, instead of an older product at the end of its development cycle," he reflects.

• **Don't neglect service and support.** The assurance of prompt, reliable service is a key factor in choosing a system, especially when dealing with a new technology. For Tamminen, whose company is located in the northeast corner of the country, simply finding someone willing to come up and service his system immediately eliminated many vendors.

Telephone support also can be helpful. Kodak, for instance, offers an on-line diagnostics system that can come in handy when a piece of equipment breaks down.



”

'Prospective users should keep in mind that anything with less than a 32-bit CPU won't be fast enough for serious electronic publishing.'

— Norton Johnson
Micro Component Technology, Inc.

with it later."

• **Be clear about performance requirements.** For Norton Johnson, communications supervisor at Micro Component Technology, Inc. in St. Paul, Minn., the key factor in choosing a system was performance. Johnson is an early user of Interleaf's Technical Publishing Software running on Sun Microsystems, Inc. workstations.

One key factor for Johnson in considering different systems is the size of the documents they will handle comfortably. "Anything with less than a 32-bit CPU won't be fast enough for serious electronic publishing," he says. Also, "having a CPU available for each machine means that adding users does not degrade performance," he adds.

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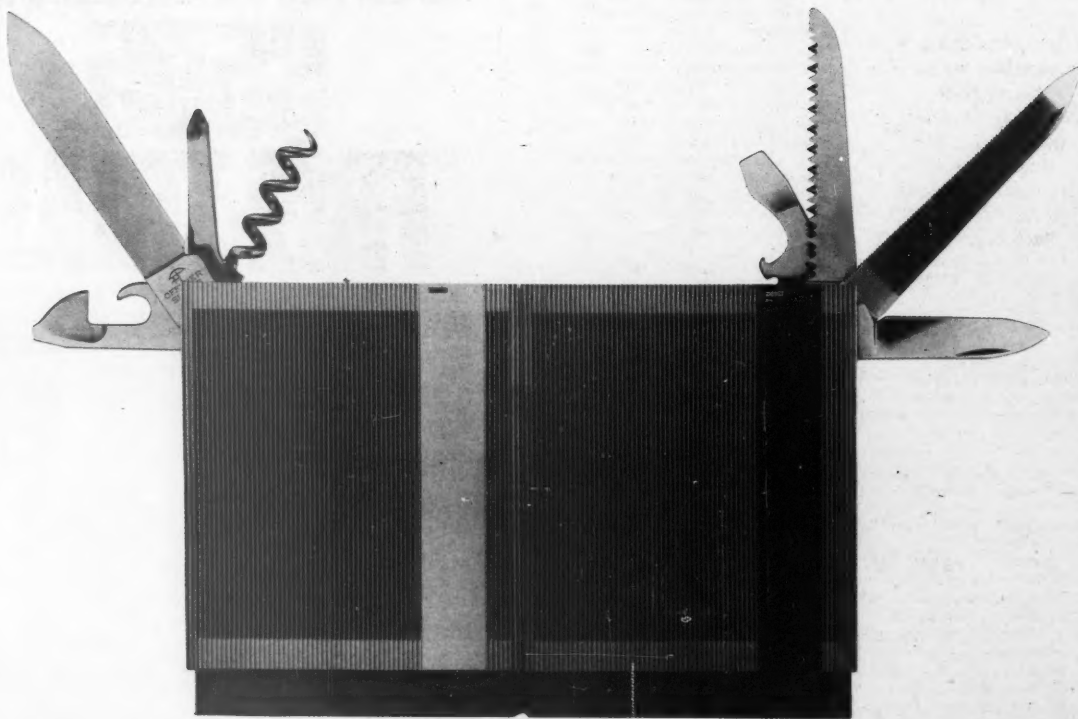
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In Depth

Building a better project manager

The question is not whether a project manager development program is affordable but rather whether MIS can afford not to have a source of excellent project managers.

By DIANA BANDER

For the MIS organization, project success creates real dollar impact, and the project manager drives that success. But top-performing project managers are hard to find. Most MIS directors and vice-presidents, when asked for the number of high-performing project managers in their own shops whom they could trust with a high-leverage project, came up with one, maybe two names.

What makes these project managers superior? More important, how can MIS/DP organizations systematically reproduce this precious talent so the systems operation can confidently handle the increasing number of large development efforts that have such dramatic impact on the corporation's bottom line?

The good news is that you can develop them. You can cultivate your own cadre of excellent project managers who can be deployed when and where needed to manage the design, development and installation of software systems throughout your organization.

The best news is that you can do this in-house. When trained within the

corporate structure, project managers will develop according to a validated model of outstanding performance and will reflect the organization's norms, culture and standards. They also will gain an in-depth understanding of your business and the internal tools and methodologies that form the fabric of your information systems organization.

Job competency analysis

Industrywide, intensive qualitative investigation into the behavior of the outstanding project managers has yielded data that defines the distinct roles, functions and critical competencies that are demonstrated by superior software project managers and that are necessary to develop average and potential performers for that job. Assembled into a behavioral model, the data reveals both the fundamental functions of the project manager's job in the MIS environment and specific competencies that drive outstanding performance of these functions.

This behavioral research process, called job competency analysis, differentiates the basic behaviors — the job functions — that actually define that particular job and make it different from any other job from the specific behaviors — those that drive the outstanding execution of the functions — that exemplary performers bring to the job. These behaviors that result in superior performance are called competencies.

The results of the analysis reveal five basic functions of the MIS project manager:

- Planning.
- Managing tasks.
- Managing the project team.
- Interfacing with the user.
- Interfacing with the rest of the organization.

These five functions must, by definition, be performed in order for the project manager job to exist. They become a performance standard against which the person in the target position is measured.

Planning involves analyzing the technical and environmental aspects of a project for its human resource, cost, time and schedule needs. The subtasks in this function rely on standard planning techniques that many project management software packages offer.

Managing tasks includes maintaining a project overview and control book, tracking changes and conducting audits and walk-throughs. Essentially, this function requires the application of all behaviors involving technical

Bander is manager of project manager services at Keane, Inc. in Boston.

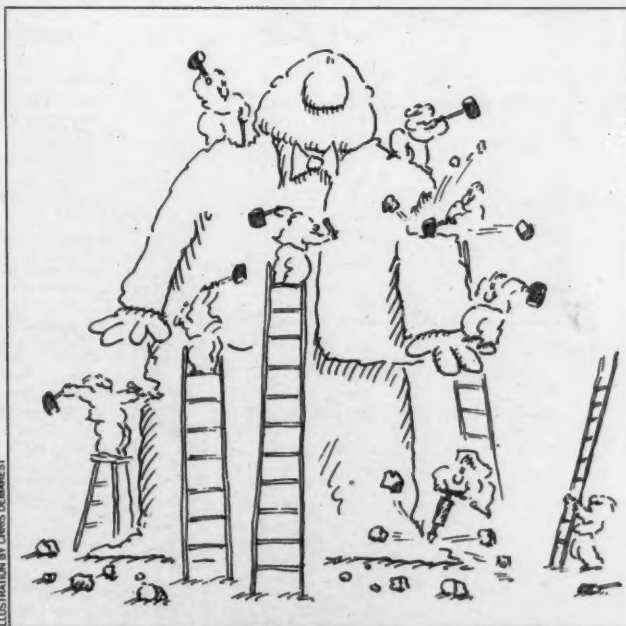


ILLUSTRATION BY CHRIS DEMAREST

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knowledge and control techniques. Again, software packages and typical project management seminars focus on this and the planning function.

Managing the project team moves more heavily into the people side of project management and requires that the project manager orient, motivate and deliberately develop the project team as well as provide continuous feedback and communication to them.

Interfacing with the client, or user, recognizes the absolute need to be involved with and responsive to the part of the organization "buying" the system — that is, the user, or client, for whom the MIS organization is developing the system. This client involvement and responsiveness manifests itself throughout all project phases from definition to de-

sign and ultimately to user takeover of the system.

Interfacing with the organization focuses on the project manager's relationship with the rest of the company. It involves negotiating for staff and resources as well as continuing to build the DP function within the corporation.

In the job competency model, each function is precisely broken down into subtasks so that the functions are behaviorally defined. This allows an organization to look diagnostically at the project management function and determine if, in practice, these fundamental functions are being executed; determine who is performing them — systems, the user or both — and how well they are being done; and, very critically, determine functions that are not being done.

By isolating and defining these

behavioral functions, the MIS organization can impose a more precise structure and standard on its project management environment and identify where and by whom these essential behaviors are being executed.

Competencies

The second half of the project manager model identifies the qualities and attributes that characterize the superior performer. Called competencies, these behaviors are organized into clusters that have a dominant theme or focus (see chart below). Some of these competencies must be uncovered in the hiring process; others are developed through coaching, on-the-job training experiences and professional development programs.

Regardless of a company's size, industry, DP shop size or structural

relationship with users, outstanding project managers bring four major behavioral skills to their job function:

- Problem solving.
- Managerial identity.
- Achievement orientation.
- Strong influence.

These skills, used more often and more completely to achieve better results, are the hallmarks of the excellent project manager.

These behavioral competencies are striking because they confirm what most MIS vice-presidents intuitively know — that the superior project manager is more than a master at cookbook techniques and methods and that program evaluation and review, critical path management and other project control techniques are necessary but far from sufficient for excellence.

The MIS world gravitates all too easily toward tasks and functions. Superior performance arises from prerequisite behavior that develops from an important combination of focused and deliberate managerial coaching, on-the-job experience and ongoing training.

Problem solving

Perhaps the single most important and most frequently displayed competency DP project managers exhibit is their ability to solve problems. This is demonstrated by skill in logically analyzing information and identifying patterns from which conclusions may be drawn.

Problem-solving behaviors require project managers to go through the same mental steps they use in the systems development process:

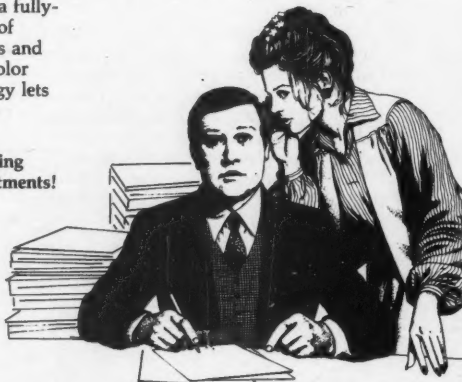
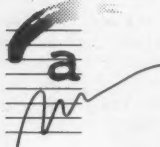
- Study and diagnose project-relevant activities, problems, concepts or alternatives and accurately define them.
- Apply systematic thought processes to break larger parts into manageable pieces.
- Apply creative and conceptual

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Project manager competency model

Problem-Solving Cluster

- Diagnostic thinking
- Systematic thinking
- Conceptual thinking
- Monitoring and information gathering

Managerial Identity Cluster

- Strong project manager identity
- Self-confidence
- Flexibility

Achievement Cluster

- Concern for achievement
- Results orientation
- Initiative
- Business orientation

Influence Cluster

- Organizational and interpersonal astuteness
- Skillful use of influence strategies
- Team building
- Team member development
- Client or user orientation
- Self-control

Information provided by Keane, Inc.

Four areas of competency distinguish the excellent project manager, according to nationwide interviews conducted by Keane, Inc. over the past two years with project managers and MIS directors and vice-presidents.

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solutions to problems.

- Monitor and evaluate results.

For example, competency in diagnostic thinking was shown by one project manager who told the user that she "would not embark upon designing a system that neither of us really understood" and withstood management pressure to begin coding prematurely.

Another project manager in a manufacturing organization used diagnostic thinking when he realized that a study on upgrading a production process had focused on nonessential issues, while the key problem was the organization's reluctance to budget for and select a vendor for new equipment.

Systematic thinking was demonstrated by the project manager who, with his boss, reviewed all the levels of the division they would have to deal with concerning different aspects of gaining approval for new equipment.

Another project manager, when asked to release a particular employee from a project, convinced his manager to think through the cost to the project, the effect on other team members and so on.

The problem-solving cluster essentially links those methods and strategies of considering, analyzing and gathering information that are critical not only at the early stages of a project but also throughout the project life cycle.

It is the impetus behind the outstanding performance of the planning and task-managing functions of the project manager's job.

Managerial Identity

As project managers expand their professional experience and move into different project phases, different skills and competencies demand development. Less emphasis may be placed on basic problem solving and more on requirements to demonstrate managerial behavior.

Collectively, these competencies are referred to as the managerial identity. They are principally demonstrated by the following characteristics:

- A strong project manager identity — "I am in charge."
- Confidence in one's own ability and judgment.
- A high level of flexibility that permits consistent allowances for alternative approaches.

One manager exhibited strong project manager identity by staying out of individual contributor-type tasks. He saw his role as ensuring that the client's needs were satisfied and that he was on schedule.

Another manager exerted managerial identity when he realized that he had been unwittingly drawn into an indi-

vidual contributor role and steered himself back onto the critical path.

One critical competency in the managerial identity cluster is flexibility.

For example, a project manager found that the user would not sign off on large pieces of the project. Instead he submitted for consideration small pieces that took less of the user's time to review and were also easier to maneuver through the budget approval process.

Flexibility also manifests itself in the project manager's ability to apply different managerial styles according to the needs of various team members.

Take, for example, the project manager who wanted to convince his team to use structured design. He spent time explaining its history and rationale to one team member who wanted that level of detail.

However, by contrast, he merely demonstrated how to

use structured design techniques to another team member who preferred simply to be told what to do.

The managerial identity cluster contains competencies that sit at the core of a superior project manager's self-concept. These competencies have a strong impact on the managing project team and client and organizational functions/interfaces.

When necessary and appropriate, effective project managers assert their au-

thority and control with confidence and are flexible in their approach.

Achievement

Successfully achieving project goals while simultaneously optimizing profitability are central to the results and business orientation of the superior project manager. These behaviors, as well as a high degree of initiative, make up the achievement cluster.

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The superior project manager is more than a master at cookbook techniques and methods, and program evaluation and review, critical path management and other project control techniques are necessary but far from sufficient for excellence.

managers demonstrate a strong focus on accomplishing tasks. They identify clearly defined goals and devote the effort necessary to meet these goals. A consistent and well-articulated set of standards governs their own performance and that of their project team. A business orientation makes project managers recognize the relationship of their projects to strategic business objectives, including marketing and profitability.

A high level of concern for achievement is one trait demonstrated by exemplary project managers. In one example, a project manager viewed his team's job as constantly improving operations. In the team's slack time, he initiated a project that resulted in lowering the billing cycle runtime. A second project manager found a way to piggyback billing information onto another part of the system, thereby eliminating redundancy, saving

money and making the data more accessible.

MIS directors and vice-presidents rely on their superior project managers' business orientation to turn a systems development investment into bottom-line profits. Unlike the average performer, who tends to view the project as a series of tasks to complete, our exemplary performers saw their projects as miniature business opportunities to which they could bring entrepreneurial talents and relish the financial and marketing payoffs that their projects brought to the organization.

One business-oriented project manager expressed the importance of his billing programs in terms of the potentially drastic effect on company revenue if the programs failed. Another project manager conceptualized system priorities in terms of how they would benefit large groups of internal users in making their jobs — and the company — more efficient. The project manager who wanted to build the best billing system because it was a flagship system critical to the MIS organization's image and objectives also exhibited a business orientation.

Influence

As individuals grow in their management careers, they must develop the facility to get work done through others. This is especially important to project managers who rarely "own" the resources they need to accomplish their project.

Successful project managers demonstrate several clearly defined behaviors that address the ability to influence:

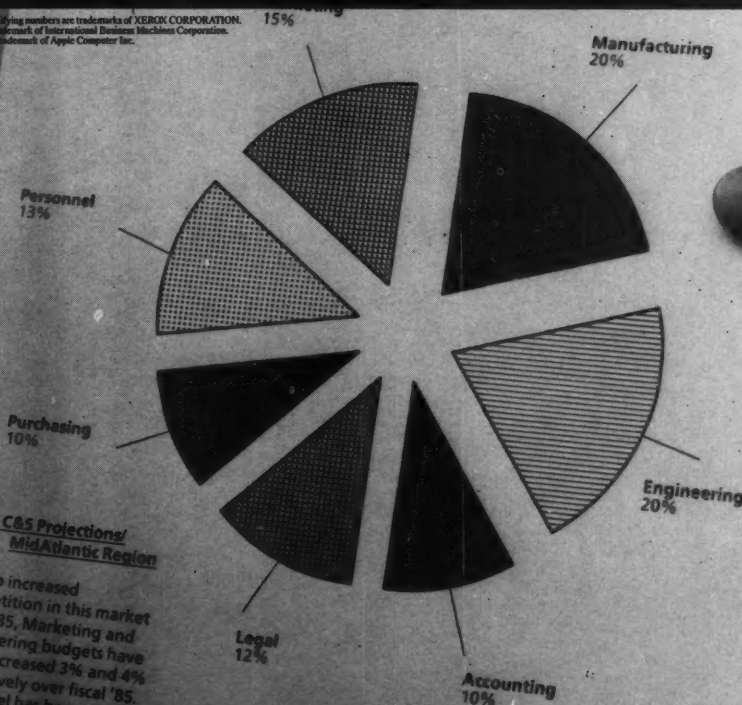
- Organizational and interpersonal astuteness.
- Compromise negotiation.
- Team building.
- Team member development.
- Well-defined user orientation.
- High level of self-control.

The superior project manager knows that possessing technical ability or asserting raw authority is often not sufficient to be successful. Top project managers use their interpersonal skills to understand and influence the user, project team members and their own MIS management.

The influence cluster includes those competencies that, guided by basic interactive management principles, enable the project manager to communicate effectively, build a strong project team and win the confidence and trust of both the user and the MIS organization.

Organizational astuteness, for example, was clearly demonstrated by the project manager who knew that the

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company president "shoots from the hip" and was easily "set off." The manager used this to his advantage by getting the president excited and involved at strategic points when the project needed a push forward.

Both organizational astuteness and skillful use of influence were implemented by a project manager who used his knowledge of the system to select those parts of the organization that would be affected by a rate change. He then used this political expertise to get specific people assigned to the rate change project.

User orientation

The ability to bring a client or user orientation to their work was common to exemplary project managers. One project manager evaluated and modified his system according to the needs of the field staff

that eventually would use it.

Another project manager made a strenuous effort, whenever one of the products was finished, to contact users and ask them how they felt about the product. Still another manager wanted users to share a sense of ownership in the test plan and therefore talked through with the users what they thought was necessary to test different functions.

One might conclude from these examples that none of these behaviors are in and of themselves unusual; and, indeed, they are not. What is unique and important, however, is the process of isolating, identifying and grouping specific behaviors that result in exemplary job performance.

That process results in a behavioral model and becomes the crucial first step toward developing a performance standard and structure.

From there, the organization can begin to train and develop its current and potential personnel and encourage them to be conscious of the behaviors they automatically bring to the job, those that currently are not part of their repertoire and those that need improvement.

Basic drive

Job competency analysis provides a powerful tool to address the business objective of hiring and developing staff for maximum effectiveness. Harvard University psychologist Robert White provided the contemporary notion of competence when he defined it as "a basic drive for effectiveness."

Interest in competence is currently growing because of its direct link with behavior. The American Management Association, for example,

has outlined basic behavioral competencies for the general line manager. Also, the American Society for Training and Development, drawing on its own extensive research, has recently published a list of behavioral competencies necessary for training and developing professionals.

The job competency analysis model becomes a performance standard by which competencies can be identified in prospective and current holders of a job. It also is valuable in evaluating current performance, measuring training progress and identifying high-potential performers as well as in assisting current jobholders' self-assessment of their own performance.

MIS organizations can use this process to define any of its discrete jobs, from the technical programmer to the analyst and the senior programmer analyst. Exemplary performers in each job category are nominated and become the experts who contribute their personal experiences about what it takes to perform that job.

In building the project manager model, superior project managers were asked to discuss, in depth, critical activities and incidents in their management careers. They were to focus precisely on their behaviors and on what they actually do in their jobs rather than to focus on their espoused theories of what they should do.

The resulting data reveals the underlying motives, abilities and knowledge used by top performers, uncovering social as well as technical knowledge and skill factors critical to job performance.

The ensuing competency model contains three major components:

- The behavioral competencies that are critical for outstanding performance.
- Definitions of each competency in observable behavioral statements.
- A road map that shows the relationship between each competency and the core tasks and functions that make up the job.

The organization can then develop customized standards for both the technical and managerial rungs in the MIS job ladder.

Benefits and options

The competency model provides benefits to both the MIS and training and development departments. With this capability, all training and development efforts become much more focused, since they can be mapped directly to the specific job functions and competencies that drive exemplary performance. This is particularly persuasive when budgets are being set and training and development plans for the coming year are being developed.

Using this process, the training and development department can justify adding or not adding courses based on the functions and competencies specifically addressed and by mapping existing curriculum offerings to the competency model for each job. The MIS organization gains a powerful tool for selecting new people into the job, making decisions about the functions and configurations of specific jobs and improving the supervisor-subordinate coaching and development relationship.

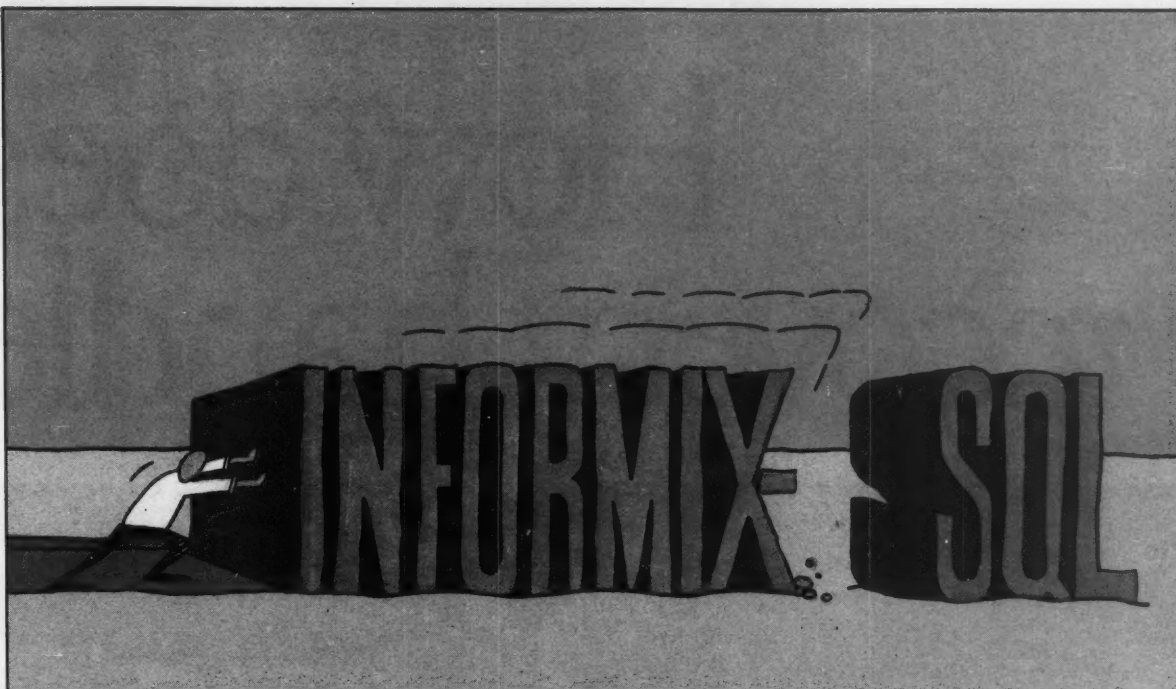
Once an organization develops its competency model, several options are available to put the model to work. The group can build a

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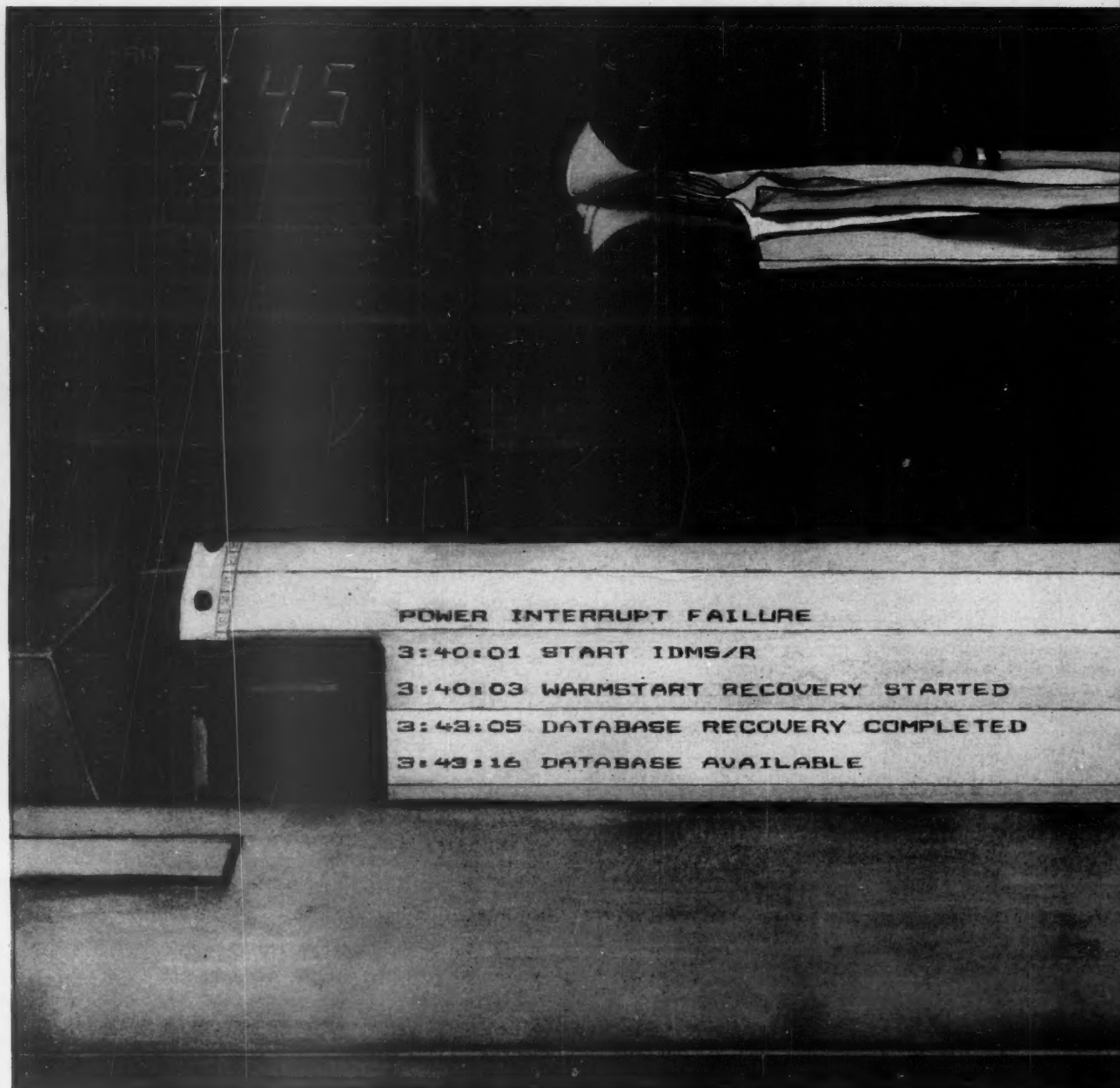
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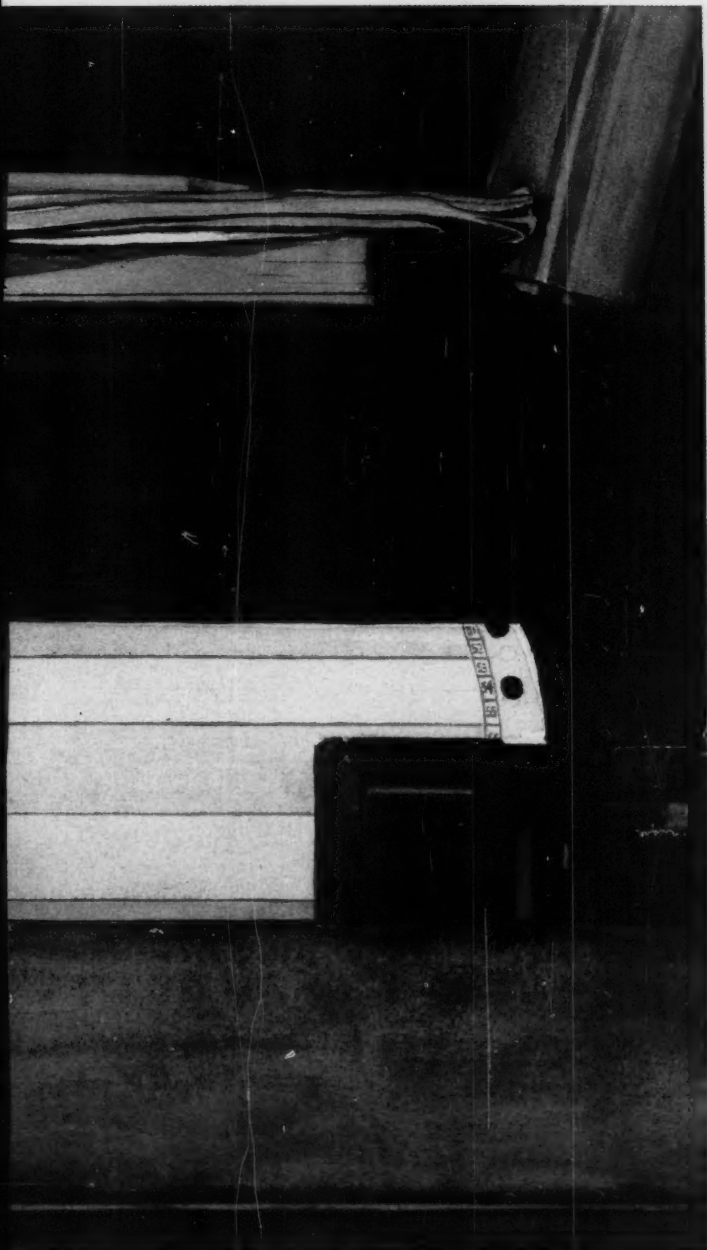
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simulation or case study in which the participants are required to demonstrate the functions and competencies in a real-life business problem. This becomes part of a classroom-based assessment process that enables jobholders to get a profile of the extent to which they bring the behavioral competencies to their jobs. The jobholders also receive important data on which functions and competencies they need to develop.

An additional useful tool is a series of informal assessment questionnaires that tap into how well individuals perform basic functions and tasks, the competencies that they naturally bring to the job and, in the context of specific assignments, the competencies that each assignment requires. The questionnaires help construct a profile that looks at the competencies demanded by the par-

ticular job matched against those brought by the person. Gaps in the profile become targets for development through courses, coaching and on-the-job experience.

Some organizations may choose to focus on developing the coaching competencies required by managers. Seminars are designed to teach supervisors and managers how to coach and develop others more suc-

cessfully. For project managers, this is particularly critical, since virtually all of the exemplary project managers involved in the model's development addressed the importance of focused, on-the-job experiences and the presence of a coach and mentor.

In contrast, none of these project managers attributed their successes to the typical two- or three-day project management course in planning

and control techniques. Almost unanimously, they addressed the role of their manager in helping them develop the behavioral competencies that distinguish average from superior performers.

More benefits, fewer surprises

An organization can reap major benefits from using a job competency approach. The project manager competency model, for example, permits description in specific behavioral terms of the fundamental elements of the job and the characteristics and skills of those individuals who do the job very well. A common language is brought to all those who hold the job or aspire to it, as well as to those who manage it.

The behavioral indicators can be used in many personnel or human resource development functions. Nondiscriminatory selection tests and interviewing programs can be developed. The performance appraisal process can be made more behavioral and objective.

Training and development programs can be built to address specific behaviors and thereby be far more cost-effective. The department or organization in which the job function resides — in this case MIS — can make important strategic decisions about its relationships with other functional areas of the organization.

A project manager competency model brings these additional benefits to the MIS organization:

- A valuable behavioral screen for the project manager hiring process.
- A diagnostic tool that enables the MIS organization to analyze a project assignment in terms of its critical success competencies and match that assignment with a project manager strong in those areas.
- A structured, individualized coaching and development program that arises out of discrepancies between the project's demands and the manager's competency profile.
- A succession-planning tool that enables the MIS director to analyze systematically current and anticipated staffing and training needs for systems development efforts.

Project leaders who participated in a project manager development program built from the competency model cited several bottom-line results for their MIS departments. The first of these was visible improvement in the work product. Better communications, scheduling and testing have led to a better quality product with fewer errors. This is particularly true for large projects.

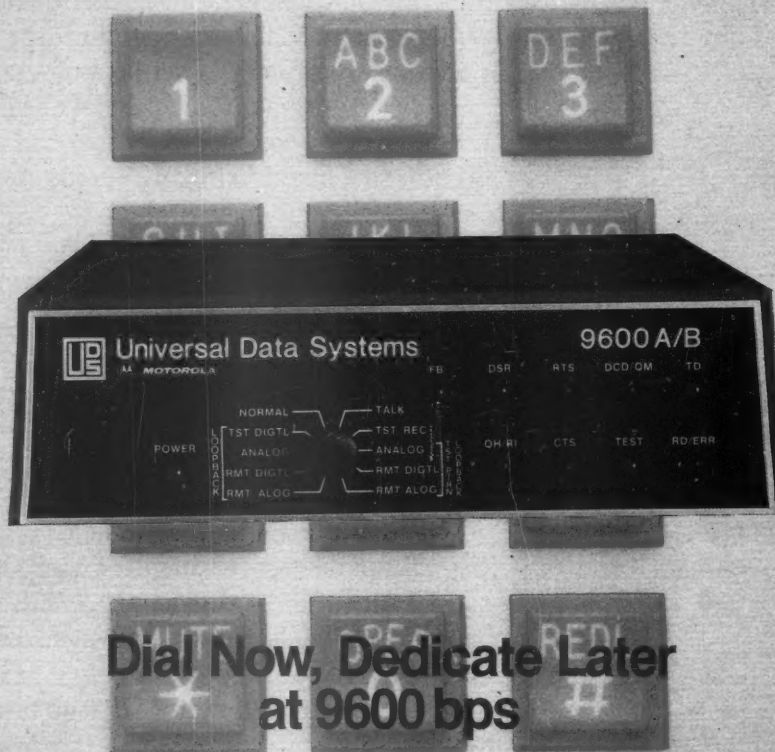
Further, errors were noted at earlier stages of the project. Fewer surprises were uncovered because of more careful preplanning and discussion of all involved parties. As one project manager put it, "If there are misunderstandings, oversights or errors, we're catching them at the beginning."

The project manager development program offers MIS a strategic tool that ensures its successful project management capability. The MIS vice-president setting out strategic objectives for the coming year might ask, "Is the development program worth it? Can I afford it?"

Instead, ask an even more fundamental question: "Can I afford not to have a pipeline of superior project managers?" The answer, of course, appears on the bottom line. The mystique is a mistake — you can make excellent project managers. ■

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The competency model permits description of the fundamentals of a job and the skills of those individuals who do the job very well. A common language is brought to those who hold the job or aspire to it, as well as to those who manage it.



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In Depth

Existing information resources can give you the competitive edge

By DONALD MARCHAND
and FOREST HORTON JR.



MIS directors are learning to use already available information resources to extend corporate business strategies and services — thereby adding value to their companies.

It is one thing to use information resources strategically inside the firm for cost leadership or product differentiation. It is another matter to find new and creative ways to use information resources in pursuing business strategies.

Increasingly, leading firms are using existing information resources in new ways — that is, reinventing and adding value to investments that have already been made.

For example, in California, Mobil Oil Corp. is marketing gasoline by installing point-of-sale terminals at the gas pumps that can be used with the automated teller machines of two leading banks.

Sears Roebuck & Co. and J. C. Penney Co. are using videodisks and personal computers to automate their customer order catalogs and extending the use of their walk-in services by offering the same catalog information to customers at home.

Textile companies in South and North Carolina are arming their salesmen with videodisk players so that the salesmen can effectively demonstrate to potential customers the color and style variations of lines of products the companies offer.

Airlines, car rental firms and hotels are teaming up to offer new bonus programs for frequent travelers through automated systems that are able to track bonus points and disburse awards.

What all of these examples have in common is the use by companies of existing information resources or technologies in new and creative ways.

This trend is supported by an equally strong tendency to permit entrepreneurs within companies to acquire resources and organize internal units to

experiment with and pilot-test new uses of information resources to market, sell and distribute products and services.

Extending services

Hence, new units are being formed both within and without traditional MIS or data processing departments to do electronic banking, telemarketing, videotex and home retailing, point-of-sale development and information retailing and wholesaling. Their objectives are usually to research and pilot-test new and creative ways of extending the services and products of the company by building on existing information resources about customers, buyers or suppliers and extending through information technologies the services offered in new or existing markets.

For example, the Buick division of General Motors Corp. has organized a Marketing through Technology department to develop a new information system called Epic to aid in the marketing of its automobiles. Epic is being used by Buick in dealer showrooms, in public areas such as hotels and shopping malls and in homes via videotex services.

In dealer showrooms, the Epic system uses PCs in kiosks that allow a salesman to respond to customer questions about the availability of various models, colors, options, prices and financing terms for Buick cars. If a customer is interested in a particular model, the salesman can use Epic to determine the nearest dealership that has the car, and if the customer is comparison-shopping with other makes of cars in mind, the salesman can, through Epic, use another videotex service, Compuserve, Inc.'s Compuserve, to get data on most makes and models of cars to compare with the Buick model under consideration.

Thus, Epic provides better and more accurate information about the Buick product line to salesmen and customers alike as well as integrates the use of a car locator system for inventory control and an external information service for comparison shopping. The long-term mission of the Marketing

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One method for using information resources strategically is based not on the capability of finding new uses for known information but on using information resources in offering a new product or service. Information resources are embedded in the new service or product in such a way as to appear indistinguishable from the nature of the product or service itself.

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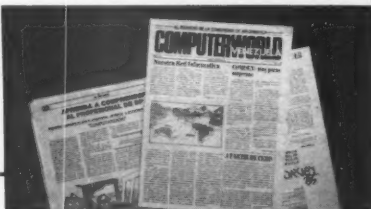


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through Technology department is to determine the profitability of using new technologies to extend the reach of information resources in creative directions to enhance the sales effectiveness, inventory control and productivity of the dealer work force.

One of the most strikingly creative ways of using "old" information with "new" information technology we've encountered is provided by Robert Waggoner. As reported in *Business Week* (March 4, 1985), Waggoner bought one-third of an antiquated newspaper clipping company, Burrelle's Information Services, Inc.:

"[Burrelle's] was on a slow track to nowhere. Sales were growing at a sluggish pace, profits were modest — and Burrelle's was still cutting and pasting much the way it did when it was founded in 1888. But Waggoner changed all that. The hustling Harvard MBA pushed Burrelle's as a growth company.

"It now [through a computer system] monitors 16,000 newspapers, magazines and trade journals for 40,000 categories, from company and product names to political issues. Customers say they've come to regard fast access to clips as a necessity."

New product or service offerings

One method for using information resources strategically is based not on the capability of finding new uses for known information but on using information resources in offering a new product or service. In this case, information resources are embedded in the new service or product in such a way as to appear indistinguishable from the nature of the product or service itself. In recent years, many examples of companies inventing new products or services in which information resources play the pivotal or key role have begun to appear.

In 1977, Merrill Lynch, Pierce, Fenner and Smith, Inc. first announced its new cash management account, which was an information resource product that permitted the integration of four services to investors:

- Automatic investment of cash and dividends in a Merrill Lynch-managed money market account.
- Credit through a standard margin account.
- Cash withdrawal by check or debit card.
- Investment advice in managing and diversifying the account. Although each of the services standing alone was not innovative, the integration of these services in a single product — the cash management account — provided an unprecedented competitive advantage for Merrill Lynch.

The cash management account was supported by a complex network of data bases, voice/data communications networks and software programs. It was sold through Merrill Lynch's brokers to investors with minimum balances of \$20,000.

Although the growth of the cash management account has slowed in recent years, Merrill Lynch was able to amass more than 450,000 accounts and \$20 billion in assets before serious competition appeared in 1982 from other investment houses (for example, Dean Witter Reynolds, Inc.), banks and financial services companies.

Moreover, since the invention of

the cash management account concept, banks and financial service companies have used their financial information resources and computer and communications technology to manufacture whole new types of financial products "on the fly."

Charles Wiseman and Ian MacMillan, in an article in *The Journal of Business Strategy* (Fall 1984), provide an interesting example of the development of a certificate of deposit (CD) fund by a large investment firm:

"At 6 a.m., leaders at a brokerage house called London to order sheaves of CDs from foreign banks, which often pay higher rates than their U.S. counterparts. By 11 a.m., they had accumulated \$50 million of the paper. The next step in the fund creation process depended on an information system that took the prices and rates, juggled them according to the firm's objectives and constraints embodied in its computer program and arrived at management fees and commissions. Thirty-six hours after the start of this production run (job shop style, to be sure), brokers were ready to start selling the fund."

The creation of new financial products on a real-time basis has brought the principles of "flexible manufacturing" to the financial services industry. Portfolio management systems of companies such as Shearson Lehman Brothers, Inc., Citicorp, BankAmerica Corp. and others offer new opportunities to tailor complex combinations of investment services to businesses or consumers with diverse assets and investment outlooks.

Similarly, in the express delivery industry, the merger of transportation (air, land) and communications services (facsimile and imaging machines) has resulted in the creation of new competitive products. During the early 1980s, Federal Express Corp. began planning and developing a new delivery service called Zap Mail, which depended on the availability of improved imaging technology and the mobilization of its fleet of 10,000 delivery vans. In its initial phase, Federal Express offered a two-hour delivery, enabling customers to send high-quality duplicates of documents and diagrams to recipients thousands of miles away in the U.S.

Customers call Federal Express for a Zap Mail pickup. A Federal Express courier picks up the document and takes it to the nearest Federal Express Imager I machine. The machine electronically transmits the document to the Federal Express facility closest to the recipient, where a high-quality duplicate is placed in a Zap Mail envelope and delivered by courier within two hours. The price when the service was initiated was \$35.

In May 1985, Federal Express extended this basic service by leasing 3,000 Imager II machines to some of its heaviest users. With the Imager II, customers can transmit and receive documents from Federal Express, eliminating the need for pickup and, in some cases, ending the need for delivery.

The Imager technology and the fleet of Federal Express vans are designed to eliminate problems that have plagued businesses using previously available facsimile transmission services. Those problems included poor quality, slow transmissions

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and lack of compatible machines to send and receive documents. By the late 1980s, Federal Express expects at least 30% of its revenue to come from Zap Mail.

Federal Express' approach to Zap Mail, which relies on the delivery of hard copies, is not without criticism in the competitive market by those who argue that long-term growth and profits in this market will be in high-speed data transmission services using computers and word processors such as MCI Communications Corp.'s MCI Mail.

In MCI Mail, for example, a message can be typed into a computer that has access to the MCI system. The message may be sent through MCI to the recipient's computer or printed at a station near the recipient for hand delivery by a local courier. The service is less expensive than Zap Mail; however, it is harder to use and cannot send charts and graphs.

MCI Mail's application is aimed at customers who wish to send one message to hundreds or thousands of recipients.

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The creation of financial products on a real-time basis has brought the principles of 'flexible manufacturing' to the financial services industry.

For example, a manufacturer who wants to send a single message to dealers can type the message into a computer in which a list of dealers' names and addresses has already been stored. With a few keystrokes, the manufacturer can send the message to hundreds of recipients at a cost of only a few dollars for each recipient.

The competition for market share between Zap Mail and MCI Mail represents a clear use of information resources for competitive advantage. Moreover, what is at stake in this competition is not just product differentiation but cost leadership.

In addition, both Federal Express and MCI are using information technologies to tie their customers directly to their product offerings by making on-premise software and hardware available for the customer to interact with the network.

Similarly, financial service companies and banks are moving beyond the design of new products such as cash management accounts and portfolio management systems by offering these services to customers who are directly tied to the seller's data bases and communications links by terminals and personal computers. Innovation in the design of new information-based products and services spills over into their marketing and distribution.

Marketing and distribution

Another strategy for using information resources to competitive advantage involves using these resources to market and help distribute a product or service.

Although electronic marketing will not replace more traditional

forms of marketing in the near future, it does provide new types of trade-offs in the expected benefits and costs of direct marketing.

Shopping malls and outlets will continue to be an important part of retailing in the U.S. However, communications and computer technologies will be used increasingly in homes, offices and many public places to permit more widespread shopping for many goods and services.

Direct marketing is another term for selling without stores. The Direct Marketing Association defines direct marketing as "an interactive system of marketing which uses one or more advertising media to effect a measurable response and/or transaction at any location." While direct marketing is often thought of just as direct mail, it also includes the use of radio,

TV, telephone, print ads, coupons, store catalogs, package inserts, bill stuffers and even matchbook covers.

Compared with newspaper, magazine, radio and TV advertising, direct marketing is interactive. Moreover, in its electronic forms, direct marketing can establish direct links with customers 24 hours a day from practically anywhere in the nation. In addition, direct telemarketing compares favorably with other forms of more conventional marketing. While telemarketing does not compete with television for mass-market appeal, in every other feature it either equals or surpasses TV, space ads and direct mail letters when these are used alone.

As the oldest form of electronic marketing, telemarketing has been used to sell virtually all types of products and services. In recent

years, firms have combined telemarketing strategies with personal computers and videodisks to provide new forms of direct marketing.

Among the top 30 direct marketing firms in the U.S., it is difficult to identify any that have not begun to develop computers and communications technology based on marketing strategies.

Sears Roebuck and J. C. Penney are pilot-testing, with IBM and AT&T, new home videotex services to offer two-way, home shopping services. Moreover, most major retailers are developing ways of using videodisks and personal computers to automate their catalogs.

Cosmetics firms such as Avon Products, Inc. and Elizabeth Arden, Inc. are offering computer-based makeup analysis to provide customers with more individualized

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Personal and property-based insurance companies are offering mall customers the option of using a videotex kiosk as a means of finding the most cost-effective insurance policies for their needs. Upscale retailers such as L. L. Bean, Inc. in Freeport, Maine, use computers to combine sophisticated systems for order handling, tracking customers and inventory, sampling mailing lists and performing complex modeling exercises of direct marketing strategies.

Finally, real estate brokers are using videodisks and personal computers not only to automate listing services but also to provide video images of properties and houses that prospective buyers can screen instead of going on time-consuming weekend house-hunting expeditions.

In addition to these forms of electronic direct marketing, most major retailers are linking with banks and credit card companies to develop point-of-sale systems that provide customer convenience as well as increase the company's ability to track inventories on a daily rather than a weekly or monthly basis.

As the lines between the physical store and electronic store continue to blur, it will be difficult in the future to design effective product and service marketing strategies without considering the trade-offs of costs and benefits inherent in all forms of electronic and traditional marketing.

The manufacturing process

Managing the information resources within the manufacturing process more effectively can also be employed in the strategic use of information resources. During the last 15 years, a dramatic change has occurred in both Japan and the U.S. concerning the role of manufacturing as a competitive weapon. Throughout the 1970s and early 1980s, manufacturing productivity declined in the U.S., while it rose significantly in countries like Japan and West Germany.

While the exact causes of the changes in productivity have yet to be defined, a change clearly occurred in the significance given to quality control and process manufacturing among Japanese and West German businesses in contrast to U.S. manufacturers. Indeed, a growing debate evolved in the international business community concerning how to adopt quality control and manufacturing improvements used in Japan, West Germany and other advanced economies into American manufacturing.

Throughout this period, two types of quality improvement strategies have

been adopted: The first type is very technology intensive and is aimed at improving the design, production and control of products throughout the manufacturing process through the use of computers and communications technology. Manufacturing management is very dependent on the information resource strategies used to control the production, inventory, quality control and cost-control functions. These functions are in turn

influenced by three support functions:

- The industrial/engineering function, which influences the design of products.
- The internal job scheduling and production control system.
- The manufacturing intelligence function, which monitors the use of labor and suppliers.

For all of these functions to work effectively, a great deal of information management is required. In recent

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As the lines between the physical store and electronic store continue to blur, it will be difficult in the future to design effective product and service marketing strategies without considering the trade-offs of costs and benefits inherent in all forms of electronic and traditional marketing.

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Line drawing characters	24	24	24
Vertical scroll	Jump	Jump/Smooth	Jump/Smooth
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years, this need has resulted in the development of highly automated systems such as manufacturing resource planning and computer-aided design and manufacturing.

The second type of quality improvement strategy, in contrast to the first, is very people intensive. It is aimed at improving the way workers are motivated, the way they work together as teams to solve problems and make operational decisions and the way they interact with and

use new technologies.

A variety of techniques and policies assist the worker in becoming a more informed decision maker and participant in the production process. These include quality control circles, job sharing and improved education and training on the job. All of these strategies have, as an integral component, the provision of a closer link between the manufacturing process and the information that workers need to make

more effective decisions on the job.

Thus, as manufacturing increasingly has been perceived as a competitive weapon in the 1980s, the objectives of quality improvement and productivity have required improved information resources, human resources and technical strategies.

Info management as a sideline

An organization may find that entering the informa-

tion management business as a by-product of what it does as its main business can be an outlet for using information resources competitively. Many firms in manufacturing and services have accumulated a wealth of experience and internal skills that can form the basis of a new service. In some cases, capitalizing on this corporate wealth may result in a new consulting service; in other cases, it may result in a new information service.

In the first case, over the years many large corporations such as Du Pont Co. and General Electric Co. have accumulated considerable experience in specific areas such as health and safety management services or facilities management. These companies, in turn, have marketed these skills outside the company as a value-added service.

In the second case, companies such as Policy Management Systems Corp. (a software service company for the property and casualty insurance market) or Dun & Bradstreet Credit Services (a credit reporting service company), have acquired information resources about their customer bases that they can market as new information services.

William King of the University of Pittsburgh gives the example of Foremost-Mckesson, Inc.'s Drug and Health Care Group, which used innovative information systems to gain a competitive edge in a noninformation business. In Foremost-Mckesson's case, King found, the company needed to make major changes in the structure of drug wholesaling and to get into new information businesses such as the processing of insurance payments related to drug purchases in order to survive.

Other approaches

Another approach to entering the information management business from this angle is to capitalize on the physical resources a company may have. For many years, companies in manufacturing or in services with underutilized capacity in computer operations have offered external time-sharing and computer services. Today, railroads are using their rights-of-way to establish major fiber-optic communications networks and are marketing these services to other companies.

A third approach to entering the information management business is to enhance the information value of one's products. In this case, manufacturing companies can enter the information business by engaging in system selling as opposed to product selling. Selling solutions to customer problems requires a great deal of enhanced expertise and information management to respond to diverse customer problems. In some cases, companies have organized specific service units to offer specialized expertise and technical help for a price.

For example, fertilizer companies have offered farmers specialized software programs to assist in analyzing crop characteristics and fertilizer needs for more than 15 years. Moreover, some aerospace firms have provided computer services

The case in color.



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and industry management consulting and software design on a for-profit basis, while other large corporations have engaged in marketing communications network-management services based on their internally developed expertise in this area.

The routes to the information management business that firms can take are quite diverse. More than anything else, what is required is a realization of the firm's real value in information investments, both in people and in data bases that can be treated as physical assets and capitalized. All that is needed is an entrepreneurial spirit to look beyond the borders of one's traditional business lines for new opportunities.

Collaborative ventures

One basic strategy for using information resources for competitive advantage is to engage in a collaborative information management venture. In the information economy, business has become too demanding and fast paced for a company to mount a significant presence in the marketplace across all its business lines. Increasingly, more emphasis is being placed on leveraging in a cooperative way the resources of two or more firms to provide entry

or a presence in selected markets.

In a 1984 study of 38 collaborative ventures, conducted by the consulting firm of Coopers & Lybrand, interviews with participating executives revealed that the sharing of resources and complementary strengths were the two leading reasons for collaborative ventures. Underlying the reasons for collaboration were the convergence of technological innovations that blurred boundaries between markets and industries as well as the pace of international competition, which required companies to form new alliances.

Collaborative ventures have traditionally been used in the manufacturing sector primarily because of larger capital requirements. However, more recent trends indicate the growth of ventures among firms in the information processing industry as well as among traditional service or manufacturing firms that wish to enter this industry.

Moreover, although research and development ventures such as the Austin, Texas-based Microelectronic and Computer Technology Corp. (MCC) — in which 15 major U.S. computer firms are partners — have been among the more visible collabora-

tions, the more common ventures occur among firms seeking an equity investment in another company, undertaking specific lines of business that do not entail creation of a new company or joining together to form a stand-alone company for the purpose of entering a new market.

The chart at left provides some examples of these types of ventures. In type one, a collaborative venture often results in outright ownership or majority shareholding of a company. In many cases, the acquired company is allowed a great deal of latitude in conducting its business, at the discretion of the parent company. IBM's acquisition of Rolm Corp. and the General Motors acquisition of Electronic Data Systems Corp. both fall into these latter cases.

In still other cases, a company may set up its own subsidiary to enter a new business and then acquire a majority interest in an outside company as well. For example, in 1982, Ford Motor Co. created Ford Aerospace Satellite Corp. as a subsidiary to operate satellites and lease space in them to companies for voice and data transmission. Then, in 1984, Ford increased its customer base and expertise in the voice/data communications field by agreeing to purchase 80% of San Diego-based Starnet Corp.

In type two — the research and development venture — two or more companies agree to share the costs and results of basic R&D. In August 1982, MCC was incorporated in re-

sponse to concerns about the Japanese fifth-generation computer project. MCC's intent is to share R&D personnel and resources from a number of computer companies to evolve strategic initiatives in the knowledge management and expert systems field.

In type three, two companies may share their involvement in a new service without need of forming a third independent business unit. In the fall of 1984, Communications Satellite Corp. (Comsat) and Holiday Inns, Inc. approved a joint venture to offer television programming and teleconferencing by satellite to the hotel chain's 1,500 U.S. facilities.

In a fourth type of venture, two companies agree to form an independent business unit. In the early 1980s, IBM and Aetna Insurance Co. created Satellite Business Systems to enter the market for satellite-based data transmission services for large corporations.

While there are many examples today of the traditional and emerging firms entering into joint ventures, it is important to note that as the information economy and information processing industry continue to evolve, the need for collaborative ventures will continue to accelerate. Moreover, collaborative ventures in the information management business will be used as both offensive and defensive weapons in the marketplace to hold off increased competition or entry on the one hand and to explore and focus on new market niches on the other.

Also, as the information processing industry emerges as the world's leading business, the boundaries for collaborative ventures will extend far beyond national economies. One example is AT&T's recent joint venture with Italy's Ing. C. Olivetti & Co.

Information resources historically have always played a role in shaping the competitive strategies of business. There is and will continue to be a growing role for information resources in the shaping of business strategies in the years ahead because of the evolution of the information economy and the dynamic growth and dominance of the information processing industry in world competition.

Moreover, as more and more traditional and emerging manufacturing and service firms seek business success in the global information economy, the need for continued adaptation and readaptation to changing opportunities in the external business environment will, in turn, result in major modifications in the internal structures and functions of business units. The functional strategies that firms adopt for managing information resources will have to be in tune with, and appropriately support, redefinitions of corporate and strategic business unit strategies. ■

Types of collaborative ventures

Type	Purpose	Example
Equity investment	Ensure supplier viability; establish an informal working relationship and exchange of technology	General Motors Corp.'s acquisition of Electronic Data Systems Corp.
Research and development ventures	Share costs and results of basic research and development	Microelectronics & Computer Technology Corp.
Cooperative ventures	Undertake a specific enterprise that does not entail creation of a separate operating company	Communications Satellite Corp. and Holiday Inns, Inc.
Operating ventures	Establish a stand-alone operating company — a "new business"	Satellite Business Systems (IBM and Aetna Insurance Co.)

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MULTI-FUNCTION MENU

S ID DATE TIME LINES PAGE FROM TO RT DESCRIPTION
PK 001 FROM NYC 01/12/86 000007 0001 SEND DT BACK ORDER UPDATE
PK 001 01/07/86 14:05 000013 0004 SEND DT JENSEN, LEGER
PK 002 03/08/86 07:24 000014 0014 SEND DT ACT PAYABLE
N 003 04/15/86 04:31 000029 0036 SEND DT CHECK REGISTER
N 004 07/18/86 07:48 000035 0031 SEND DT EMPLOYEE SORTE
R 005 08/08/86 08:28 000043 0037 SEND DT STOCK HOLDINGS
E 001 FROM NYC 00/14/85 000056 0051 SEND DT BENEFITS REPORTS

Q > VIEW P > PRINT PK > PRINT > KEEP PK > PRINT > OPTIONS P > ROUTE
"PRG" > ALL ROUTE TO START PAGE PAGES ALP AFTER PRINT P > PRINT > FRASE
P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO
P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO

VIEWCOM
ONLINE REPORT DISTRIBUTION SYSTEM
UTILITY MENU

1 > UTILITY >>>
P > DISPLAY/ALTER FORMS ON PRINTERS M > MODIFY ACTIVE PRINTER
B > ROUTE REPORT TO BATCH OR RJE P > PURGE REPORTS BY AGE
A > ALIGNMENT FORMS PATTERN GENERATION C > DISPLAY FORMS CONTROL IMAGE
R > ROUTE REPORT TO ANOTHER REGION

MSG COPIES AUTOMATIC PRINT ALIGNMENT Y/N
FORMS ID PRINTER FUNCTION P > FORWARD SPACE
PRINTER ID S > STOP AFTER PRINTING P > HALT (IMMEDIATE)
REPORT ID OPD OUTPUT CLASS JOBNAME R > REGION NAME
DELETE REPORTS WHICH ARE N DAYS OLD ENTER NUMBER OF DAYS
RETAIN REPORTS IN HOLD STATUS Y/N
P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO P > SCROLL TWO

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- Automatic Archive Purge/Restore Eliminates Report Reruns
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- MVS/XA, MVS/SP, MVS, OS/VS1, DOS/VSE

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PHONE _____ IBM OPERATING SYSTEM _____

NEW PRODUCTS

Powerbase performance enhanced

Powerbase Systems, Inc. of Birmingham, Mich., has released a new version of its \$349 Powerbase menu-driven, relational data base package, which reportedly is 21% faster and provides more file room than the previous version.

Much of the increase in performance is because of changes in the structure of the .KEY files, which allow the package to accommodate up to 288% more records in a file with multiple indexed fields. Changes to the .KEY files also save disk space when large files are used. A data base with seven files, 1,260 records and six indexed fields requires 105,984 bytes in Version 2.2., compared with 262,656 bytes in the previous version. However, files with few records may require more disk space.

In addition, Powerbase now has the ability to exchange Powerbase data with data from Wordperfect Corp.'s Wordperfect secondary files to perform merges. Powerbase was already able to exchange files with such popular packages as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase II and Multimate software. Also, Powerbase's in-load and out-load features are now compatible with Lotus 1-2-3, Version 2.

Other enhancements include the ability to take advantage of the Intel Corp. 8087 and 80287 math coprocessors and additional support for random-access memory (RAM)-resident macro software such as Prokey by Rossoft, Inc. and Superkey by Borland International, Inc.

Users covered by the Powerbase 2.1 maintenance agreements automatically receive a free upgrade. Other users can upgrade for \$25. Users of Powerbase versions 1, 1.1, 2, and 2.01 can order a new manual and Version 2.2 disks for \$75.

Powerbase runs on the IBM Personal Computer, Personal Computer XT, AT and 3270 Personal Computer as well as compatible computers. The package requires 320K bytes of RAM and Microsoft Corp. MS-DOS or IBM PC-DOS 2 or higher. Site licenses are available from Powerbase.

PC-based microfilm tool out

Kodak system captures, retrieves document images

The Eastman Kodak Co. of Rochester, N.Y., has announced the Kodak KAR-1500 PC information system, a microcomputer-based system used to capture and retrieve documents on microfilm.

While document images are being captured by the RV-3 camera, the operator keys in descriptive information, creating the index that is later employed for retrieval. Up to three levels of indexing are supported. The simultaneous operation eliminates the need for postprocessing indexing. Faster rotary cameras can also be used with the KAR-1500 PC system, although indexing must be done separately afterwards.

To retrieve a file, the operator keys the known descriptive information into the microcomputer. The software searches the disk and displays a list of the microfilm magazines that contain the information requested. After the proper magazine is inserted into the retrieval terminal, the operator commands the retrieval unit to advance to the requested frame. A print-out of the document then can be made.

A basic KAR-1500 PC system costs about \$30,000 and includes an IBM Personal Computer AT with a 30M-byte hard disk and computer-aided retrieval (CAR) software (\$14,000), a Kodak Starfile RV-3 camera for document capture (\$6,000) and a Kodak IMT-50 microimage terminal for retrieving, viewing and printing documents (about \$10,000).



The Kodak KAR-1500 PC supports up to three levels of microfilm indexing.

The setup also includes the new Kodak Starfile CAR copy-board accessory, which links the microfilm camera to the personal computers. The copy board is used to place the sequence numbers and other identifying marks sent from the micro onto the microfilm when it is indexed.

The KAR-1500 PC software is sold separately for about \$9,000 and requires about 3M bytes of overhead on the hard disk. The CAR software requires a minimum 10M bytes and will run on an IBM Personal Computer XT and compatibles. The other components also are available separately.

Portable word processor debuts

Quadram Corp. of Atlanta has unveiled the Keystyle 80, a portable word processing system that consists of a laptop intelligent keyboard, and the Writestyle, a portable letter-quality printer.

The 3-lb Keystyle 80 is said to feature read-only memory-based word processing software, telecommunications software and calculator, calendar and clock functions. It also features an 8-line by 80-char. pop-up screen.

The Keystyle can also be used as a keyboard for Quadram's Datavue series of portable IBM Personal Computer-compatibles via an infrared link. Optional cables allow the Keystyle to be used as a keyboard for IBM Personal Computers and compatibles. Files can be transferred to a PC or compatible via the RS-232C port.

The 6-lb Writestyle is said to use a direct impact tub-style printwheel with a print speed of 14 char./sec., bidirectional. It can be used with the Keystyle, or as a printer for Datavue and IBM Personal Computers and compatibles via centronics parallel and RS-232C serial interfaces.

The Keystyle and the Writestyle retail for \$349 each or \$599 together.

Sony MVR-5500 still video recorder offers floppy disk alternative to slides

Sony Corp. of America, located in New York, has introduced the Promavica Still Video Recorder MVR-5500, a frame storage device designed as an alternative to slides.

The system is said to record still video pictures on a Mavipak disk. The Mavipak is a 2-in. magnetic video floppy disk that is virtually identical in size to a 35mm slide mount. According to Sony, the disk can record 50 fields of pictures or 25 frames with double the vertical resolution and with 360 lines of horizontal resolution. The disk uses an identification code of up to six digits for each image. The MVR-5500 can access from one image to another anywhere on the disk within 2 sec., Sony stated.

The MVR-5500 is said to be com-

patible with virtually all composite video and analog/digital red-green-blue (RGB) signals from cameras, video tape recorders, videodisks, television tuners and computers. Its composite video and analog RGB outputs allow it to be used with video projectors, monitors and video printers. It also features the ability to synchronize with audio recorders.

The recorder/player has an RS-232C port as well as two six-pin remote control ports for the Program Edit Controller, the RM-E5500.

The Promavica system is priced as follows: MVR-5500 Still Video Recorder, \$3,400; RM-E5500 Program Editing Controller, \$1,200; RM-52 Remote Control Unit, \$150; and 10 MP-50 Video Floppy disks, \$100.

Upgraded Tandy micro bows

High-end 3000 gets added storage, RAM

Tandy Corp. of Fort Worth, Texas, has announced a new \$4,499 version of its Tandy 3000 IBM Personal Computer AT-compatible computer featuring a 35M-byte hard disk drive.

According to a company spokesman, the Tandy 3000 35 MB HD computer offers 5M bytes more storage, greater memory expansion capability and a standard 640K bytes of random-access memory (RAM) — 128K bytes more RAM — than the newest IBM PC AT.

The Tandy 3000 35 MB HD comes with one 1.2M-byte floppy disk drive and a standard 640K bytes of memory, which can be expanded to 12M

bytes under the soon-to-be-available Xenix operating system, Tandy said.

The previous high-end Tandy IBM PC-compatible computer was the Tandy 3000, introduced last November. That machine will continue to be offered with 512K bytes of memory and a 1.2M-byte floppy disk drive for \$2,599. A 20M-byte hard disk version will continue to sell for \$3,599.

The Tandy 3000 computer uses the Intel Corp. 80286 microprocessor and operates at 8 MHz. The Tandy 3000 Deluxe Graphics Adapter displays the standard IBM Color Graphics Adapter mode as well as additional modes.

Standard features include a real-time clock with battery backup, a serial and parallel adapter, a keyboard and a provision for an optional math coprocessor.

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NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE
& SERVICES

Systems software

IPT Corp. has introduced **F68K** and **C68K**, software products said to facilitate multiprogrammer Fortran and C code development on Digital Equipment Corp. VAX and Data General Corp. MV and Eclipse systems.

Each system includes a compiler, assembler, linker and librarian. Also included are IPT's source-level debuggers, Fortran-lint and, for C, Lint-Plus. Both debuggers are said to analyze all the modules in a program simultaneously and output operator-selectable levels of comment about the code.

F68K and C68K cost \$9,500. Both Fortran-lint and Lint-Plus are avail-

able as stand-alone tools for \$4,500.

IPT, 1096 E. Meadow Circle, Palo Alto, Calif. 94303.

Swanson Analysis Systems, Inc. has ported its finite element analysis program, **Ansys**, to Digital Equipment Corp.'s Vaxstation II/GPX and VMS operating systems.

Ansys is said to integrate preprocessing, solution, postprocessing and color graphics. It is said to be able to generate two- and three-dimensional, hidden-line or section plots and offer options such as multiple windows, zoom and perspective. A solid modeling module facilitates design visualization and optimization.

Ansys on the Vaxstation II/GPX is licensed on a monthly basis ranging from \$1,500 to \$21,000, depending on

the number of users.

Swanson Analysis Systems, P.O. Box 65, Johnson Road, Houston, Pa. 15342.

Pansophic Systems, Inc. has announced **Telon 1.4**, an enhanced version of its application development productivity system for IMS-DC and CICS environments.

Telon has three integrated software components: the Telon design facility, the application system generator and the modeling and testing facility. Enhancements include prototyping, modeling without compiles, panel presentation stores and automated user documentation.

A Telon 1.4 perpetual license ranges in cost from \$130,000 to \$285,000. After the first year, main-

tenance costs 12% of the purchase price per year.

Pansophic, 709 Enterprise Drive, Oak Brook, Ill. 60521.

4D Software Ltd. has announced **Control-M**, a production control software system for IBM mainframe computers.

According to a company spokesman, Control-M features real-time release and contention elimination as well as the ability to dynamically handle the reallocation of resources between multiple CPUs.

Other features include job dependency definition, user notification, job recovery, dynamic print disposition, audit setup of IBM's JCL and reporting.

Control-M is priced at \$42,000.

4D Software, 4 Browning Lane, Hartsdale, N.Y. 10530.

Applications packages

AGS Management Systems, Inc. has announced **Release 5.3** of its **PAC II** project management system.

Release 5.3 reportedly features new user and technical documentation, new entry screens, improved system menus and prompts, increased flexibility and power in tracking and retrieving resource information, increased security and increased flexibility in scheduling and tracking milestones.

The PAC II system runs on large- and medium-scale IBM, Digital Equipment Corp., Honeywell, Inc., Prime Computer, Inc., Burroughs Corp. and Sperry Corp. Univac computers.

PAC II Release 5.3 is priced starting at \$44,000.

AGS Management Systems, 880 First Ave., King of Prussia, Pa. 19406.

Utilities

Professional Computer Resources, Inc. has announced **RMS Comparesource**, a software utility designed to simplify installation of the vendor's RMS/38 applications software.

RMS/38 is a resource management system designed to run on the IBM System/38. RMS Comparesource is said to be implemented as a System/38 command. The product is said to provide validation of input parameters with compatible data presentation.

Users can include or exclude all forms of comments, print an exception list or a complete list with exceptions noted, include the change date of each source line and hold or print the output, according to Professional Computer Resources.

RMS Comparesource is priced at \$2,750.

Professional Computer Resources, Two Mode America Plaza, Oak Brook Terrace, Ill. 60181.

Relational Database Systems, Inc. has announced that its **Informix ESQ/Cobol** software is now available for Ryan-McFarland Corp.'s RM/Cobol compilers.

According to the vendor, Informix ESQ/Cobol will enable RM/Cobol application programmers to access the Informix-SQL relational data base via SQL commands embedded in

Continued on page 90

ON JULY 9, WE FOCUS
ON SOFTWARE.

The market for software is simply going wild. With new applications. New technologies. New ideas. And MIS/DP professionals are the ones who have to deal with it all.

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But hurry, closing is May 30. For more information, contact Ed Marecki, Vice/President Sales, Computerworld Focus, 375 Cochituate Rd., Framingham, MA 01701-9172, (617) 879-0700. Or call your local Computerworld sales representative.

Issue: July 9 - Closing: May 30

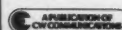
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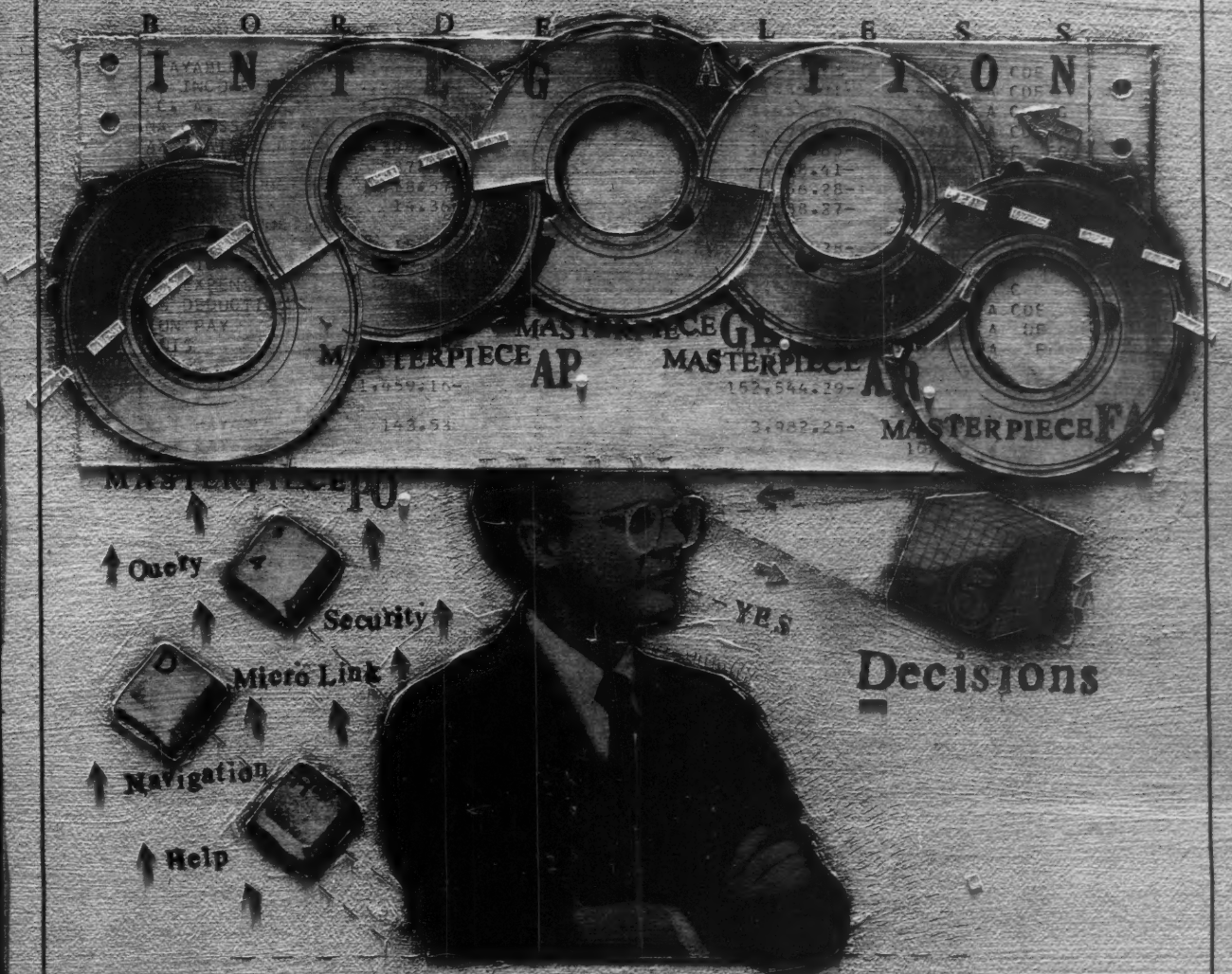
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Together, we can find the answers.

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NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 86
their programs.

The programs are said to pass through a compiler to convert SQL statements to Cobol, and the compiled Cobol code can interface with the relational data base.

Informix ESQL/Cobol for RM/Cobol compilers is priced from \$595 on a personal computer to \$36,000 on an IBM mainframe.

Relational Database Systems, 4100 Bohannon Drive, Menlo Park, Calif. 94025.

Fusion Products International, Inc. has added a table creation feature to **Fusion/36**.

Fusion/36 is a report writer and file manager package for the IBM System/36. The table creation feature is a data base tool enabling users to design an inquiry. Tables divide records from up to eight files into categories and then analyze field data in each category. A single table can hold up to 100 categories. A table can present a three-

dimensional summary of a data base in one pass.

Fusion/36 with the table creation feature costs \$3,600.

Fusion Products International, Suite 300, 4000 Civic Center Drive, San Rafael, Calif. 94903.

Global Software, Inc. has announced **Vista**, an information retrieval product for IBM mainframe and mini-

computer systems.

Vista is said to be an on-line, menu-driven system offering query and report writing facilities.

Features include password security, access to information across various applications and customized ad hoc or recurring reports and queries.

Vista is packaged to enable users to access specific applications or multiple application data files, including non-Global products.

Vista is priced from \$25,000 to \$60,000.

Global Software, 1009 Spring Forest Road, Raleigh, N.C. 27609.

Data base management systems

Unify Corp. has ported its **Unify Relational Data Base Management System** to the IBM RT Personal Computer.

According to the vendor, Unify DBMS was designed for high-volume transaction-oriented applications in commercial environments and for scientific and real-time applications. It features high-performance multiple access methods and the capacity for storage of more than two billion records.

A development license for Unify DBMS on the IBM RT PC costs \$1,995. One runtime license costs 50% of the development license price with quantity discounts available.

Unify, 4000 Kruse Way Place, Lake Oswego, Ore. 97034.

Training software

LS/Werner & Associates has announced the **Alvey Expert Systems Starter Pack**, said to be an expert systems educational product.

The pack provides an interactive, self-contained method in which to learn about expert systems. It consists of five modules: versions of four expert system software tools and a user guide.

According to the vendor, the four tools are set in context by presenting such topics as the issues surrounding the development of successful expert systems, expert systems methodology, introduction to and analysis of the four tools and a list of consultants to contact for further guidance.

The Starter Pack costs \$1,995.

LS/Werner & Associates, Suite 331, 1433 Santa Monica Blvd., Santa Monica, Calif. 90404.

Deltak, Inc. has unveiled its **Training Management System** for the IBM Personal Computer XT or AT.

The menu-driven, on-line interactive system is written in Ashton-Tate's Dbase III and features curriculum planning and comprehensive reporting. It also includes color monitor capabilities.

According to the vendor, the Training Management System was designed to establish training plans for learner-paced instruction and lecture classes, track individual training plans, summarize the results and generate management reports.

The system is reportedly available to Deltak customers through their rental

Continued on page 94

WHEN IT COMES TO BUILDING WIDE-AREA NETWORKS, THERE'S NO SUBSTITUTE FOR EXPERIENCE.

While any number of companies can offer to sell you a private wide-area network, one company can offer you 25 years of computer and communications experience along with it. BBN Communications.

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But the U.S. Government isn't the only customer with tough networking problems that BBN has helped to solve. Numerous major corporations, among them Wang, Weyerhaeuser, and MasterCard, not to mention European giants like England's National Westminster Bank and Italy's largest corporation, ENI, have also found the answers they were looking for from us. Each came to BBN with a unique networking problem—from integrated voice/data transmission to electronic mail to credit authorization—and each came away with a unique networking solution.

If you're going to make a major commitment to a wide-area network vendor, only three things count. Experience, experience, and experience. In wide-area networking only one company delivers it all.

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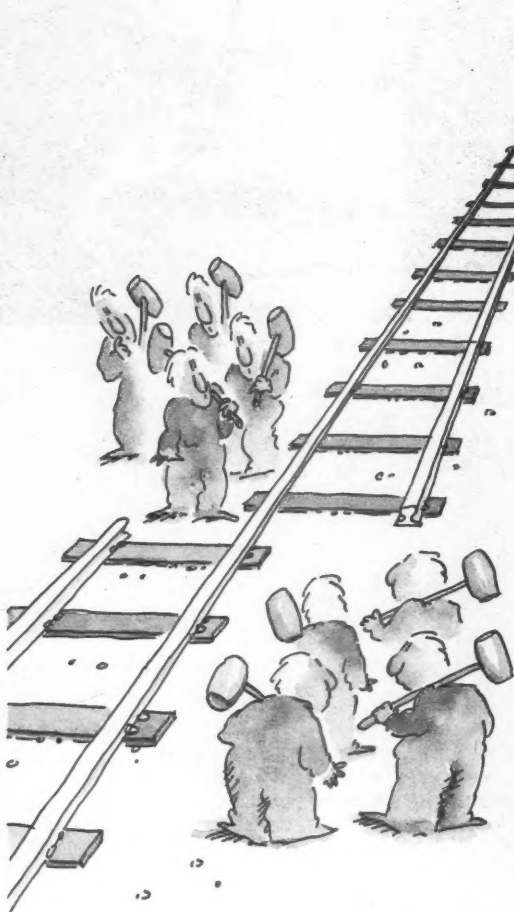
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Why is MODEL 204 the pacemaker for handling larger databases?

Heartbeat response.

When it comes to fast response to queries and updates, there's no database too large for Computer Corporation of America's MODEL 204.

In fact, against the competition, the bigger the database, the better we look. Here's an example:

A large travel agency with 900-plus on-line terminals uses MODEL 204 to maintain information on accommodations and transportation options around the world. In a benchmark simulating 1,000 users, 1,920 complex transactions were made in one minute on the travel agency's 2-gigabyte database. Response time? An average of 1.1 seconds.

The simple fact is, there is no relational-based DBMS that can store more, or handle it faster than MODEL 204, no matter how complex your queries get.

Like one large direct marketing firm that uses MODEL 204 for on-line real time sales tracking and analysis.

Their 10-gigabyte database contains 4,000 fields, of which 3,000 are keyed. Average response time to extremely complex queries of 3,000 or more transactions per minute? Less than 10 seconds. For less complex queries, response time drops to less than 2 seconds.

Heartbeat response. Another way of saying MODEL 204.

Get the facts. Write John Donnelly, V.P. Marketing, Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142. Or, call 1-800-258-4100, extension 603.

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Today's system software buying decisions will affect your company for years to come.

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If you're about to invest in system software for your mainframe, here's some free advice that may surprise you:

Go slowly.

The decision you're making will be felt for years to come throughout your entire organization. So don't try to short-cut the selection process.

And in particular, don't make a decision without talking to people with first-hand experience—the users of the products in question.

Naturally, we believe that Software AG products offer the best solutions available to the problems you face. And we'd like to have an opportunity to convince you—not by competitive claims and counterclaims, but by demonstrated performance in real-world customer sites.

In the meantime, we'd like to offer a few thoughts on some factors that contribute to performance.

Needed: integrated, long-term, worldwide solutions.

If you've been involved in data processing for any length of time, you already know more than enough about the dangers of piecemeal "quick fixes". You don't have to be sold on the value of integrated tools that meet a full range of organizational needs through a common syntax and shared procedures.

But while many vendors preach integration, few practice it on the scale of Software AG. From our core products, ADABAS and NATURAL, we have created an entire universe of software products that simultaneously meet the needs of everyone from MIS professionals to end users with no programming experience.

We're also integrated in another way—geographically. As more and more organizations seek to coordinate resources and data on a worldwide basis, they need a caliber of support that is consistent worldwide. Software AG's reach is unique among independent software vendors—with products installed in 52 countries.

Fourth-generation technology: Who needs it? Who's got it?

A lot of vendors have expended a lot of hot air on the subject of fourth-generation languages. And we'd be the last to deny that a well-designed 4GL like NATURAL can be a phenomenal productivity tool—as much as 10 to 20 times more productive than COBOL, for instance.

But the language itself is only part of the story. Because in committing to a fourth generation system, you're really committing to an entire technology for meeting your organization's needs. You'd better be sure that technology

includes everything you need—from DBMS, 4GL, and data dictionary to end-user computing tools, office systems, micro/mainframe links, and intersystem communication facilities. If it doesn't, you may be looking at only a partial solution.

In any case, don't evaluate a 4GL by itself. Evaluate it in relation to the other products that are required to satisfy your total information needs. Do they share a common architecture or syntax? Were they designed together, or are they simply marketed together? And most important of all, how do people like working with them?

We know how people like working with NATURAL. After all, it's the world's most widely installed, widely experienced fourth-generation language—used by over 75,000 programmers. If you're looking for insights into 4GL technology, you might start by talking with one of them.

Industry surveys repeatedly rate Software AG #1.

It's one thing for a vendor to be proud of its products. It's another for an entire industry to share in that high regard.

Yet that's just what's been happening with Software AG products. For several years, *Datapro* and *Datamation* have both published annual surveys of system software users. And Software AG has repeatedly come out on top by a variety of yardsticks. That's not rhetoric—that's performance.

Software AG: high-performance vendor to over 2000 customers.

Because system software is a long-term investment for most organizations, it inevitably carries with it a long-term relationship with the software vendor.

And for many years, we and our users have recognized the importance of that relationship. In fact, we have worked together to shape it in the interests of delivering the best possible product performance.

But while we're glad our users take the trouble to respond to surveys, we have no control over their comments.

Which makes it all the more gratifying to see the survey results. And all the more imperative that you hear what users have to say—before you buy.

Just give us a call today. Or send in the coupon. We'll be glad to put you in touch with Software AG users in situations comparable to yours, so you can find out for yourself what industry insiders have known all along:

Anyone can talk. But when it comes to performance, Software AG stands alone.

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 **SOFTWARE AG**
11800 Sunrise Valley Drive, Reston, VA 22091

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 90

agreements, or it can be purchased for \$1,100.

Deltak, East-West Technological Center, 1751 Diehl Road, Naperville, Ill. 60566.

MICROCOMPUTERS

Systems

Vision Research, Inc. has announced its **Desktop Page Composition System** for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

According to the vendor, the system consists of a 300 dot/in. resolution input scanner, a Megabuffer interface board and Megascan image and text editing software.

The Composition System reported-

ly lets the user store electronic snapshots of printed or computer-generated material and edit them under computer control. The images can be documents, drawings, photos, line art or screen snapshots of other application programs.

The Desktop Page Composition System is priced at \$2,495.

Vision Research, Suite B-112, 1590 Old Oakland Road, San Jose, Calif. 95131.

Digital Vision, Inc. has introduced a version of its **Computereyes** video acquisition system for IBM Personal Computers and compatibles.

Computereyes is said to allow users to capture real-world images with any standard video source. According to the vendor, two acquisition

modes allow the capture of either high-contrast images or 16 gray-level images. On-board switching allows the video source signal to be previewed on the monitor.

The package includes interface adapter, complete software support on disk and manual. It costs \$249.95.

A system including a video camera is priced at \$529.95.

Digital Vision, Suite 2, 14 Oak St., Needham, Mass. 02192.

General Micro Systems has introduced **VK4010**, a hardware and software package said to enable an off-the-shelf personal computer to match the speed and graphics of a dedicated computer-aided design and manufacturing workstation.

Full keyboard and screen emula-

tion of Tektronix, Inc.'s 4010/14 graphics terminals is provided, as well as Digital Equipment Corp.'s VT series emulation.

Hardware includes a graphics controller, monochrome monitor and a character generator. The software features user-programmable soft keys and scripts and a DOS shell.

VK4010 costs \$2,295.

General Micro Systems, P.O. Box 5330, 9951 Valley View Road, Minneapolis, Minn. 55343.

Panasonic Industrial Co. has unveiled the **Business Partner**, an IBM Personal Computer-compatible desktop system.

The Business Partner is based on an Intel Corp. 16-bit 8086-2 microprocessor. It is user-switchable between 4.77 MHz and 7.16 MHz.

According to the vendor, the Business Partner offers six expansion slots and includes 256K bytes of random-access memory. Other features include Microsoft Corp. MS-DOS 3.1 and GW-Basic, a built-in parallel port and an IBM Personal Computer AT-style keyboard.

The \$1,295 model features a 5¼-in. 360K-byte floppy disk drive; the \$1,495 model incorporates two disk drives.

Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

Software applications packages

Realia, Inc. has announced **RealCICS**, said to allow development of CICS applications for either an IBM mainframe or Personal Computer.

The system includes the command-level Cobol program preprocessor that converts CICS command-level Cobol programs to a form that can be compiled by Realia Cobol.

The resource definition processor validates and converts CICS system macros to a form suitable for the Personal Computer. The Basic Mapping Support (BMS) macro processor produces the tables and Cobol copy members required for mapped screen use, and a map editor allows the interactive painting and generation of BMS maps.

RealCICS runs on the IBM family of Personal Computers. It costs \$995. Additional copies of the operating environment cost \$150.

Realia, 10 S. Riverside Plaza, Chicago, Ill. 60606.

Samna Corp. has announced **Samna Decision Graphics**, a graphic software package for IBM Personal Computers and compatibles.

According to the vendor, users can create graphs automatically from numerical and statistical data.

The software package is said to convert rows and columns of numbers into graphic forms and present input and calculations on the screen, on a plotter or on a printer. According to the vendor, there are 375 types of graphs available and 30 built-in calculations.

The software accepts data from a central computer, external files, information entered on the keyboard or old files.

Samna Decision Graphics costs \$450.

Samna, 2700 N.E. Expwy., Atlanta, Ga. 30345.

EXECUTIVE REPORTS

Special Editorial Features

Every issue of Computerworld presents either a Product Spotlight or Executive Report. For advertisers, it's still not too late to take advantage of the hot topics set for June!

Executive Round Table (June 16) Five top executives discuss such key MIS/DP industry and business issues as: the two most important issues MIS/DP execs face in 1986; does next year's budget include more or less hardware or software purchasing; is management facing mostly technical or administrative issues? Also, expert thoughts on solving telecommunications problems and the proposed Burroughs-Sperry merger. Closing date May 30.

Personal Computer Graphics (Product Spotlight, June 23) How to evaluate and select PC graphics software for business presentations. Plus, graphics mainframe-to-micro links and a user survey. Closing date June 6.

Integrated Office Automation Systems (Executive Report, June 30) Current strategies of major vendors supplying integrated office systems. Established products, and newer ones that offer unique OA technologies like voice annotation and image technology. Determining user needs; the latest on network security. Closing date June 13.

And it doesn't stop there! Important and pertinent Executive Reports and Product Spotlights topics continue through July and August.

ISSUE	TOPIC	CLOSING DATE
July 7	Data Security (Executive Report)	June 20
July 14	Expert Systems (Product Spotlight)	June 27
July 21	PBX Networks (Executive Report)	July 3
July 28	Management Training for DP Executives (Executive Report)	July 11
August 4	Applications Generators (Product Spotlight)	July 18
August 11	Information Centers (Executive Report)	July 25
August 18	On-End-user Computing (Executive Roundtable)	August 1
August 25	Image Processing (Product Spotlight)	August 8

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PRODUCT SPOTLIGHTS

Introducing NonStop VLX.

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for large applications in on-line transaction processing.

More transactions per second
at a lower cost per transaction than any system in the world.

THE CIRCUITRY'S FAST.

We designed the system in our own laboratory, right down to our own unique VLSI chips. The result is more circuitry in less space. With fewer components than our next largest system, the VLX delivers twice the performance and three times the reliability.



PROCESSORS WITH LARGE APPETITES.

The VLX processors move transactions in 32-bit chunks. They reach into main memory in 64-bit chunks. Because this happens in parallel, more work gets done in less time at a lower cost per transaction.

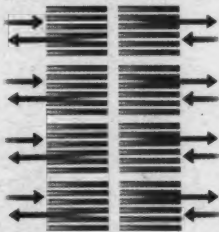
THE SERVICE IS EASY.

All critical components are field replaceable. When service is required, it's faster. You don't even have to stop an operation to add or replace components.



THE DATA EXPRESSWAY.

In a conventional database, I/O requests must be handled sequentially. This creates queues that slow response time. In the VLX system, there are multiple paths to multiple disks. Data enters and leaves the database simultaneously. No time is wasted, and all disk space gets used.

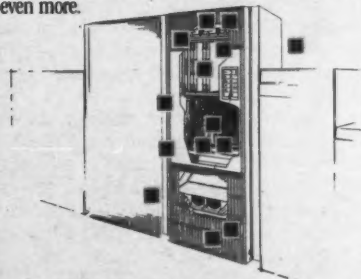


DIAGNOSTICS FROM A DISTANCE.

An integrated microprocessor allows us to monitor the system environment from anywhere in the world. We can even run stress tests remotely. If a failure does occur, the VLX has the capability to automatically dial out to remote centers anywhere in our worldwide network.

THE SYSTEM KNOWS THE SYMPTOMS.

Expert systems software, using fault analysis, directs the problem diagnosis systematically. It also allows us to analyze it and shorten service time even more.

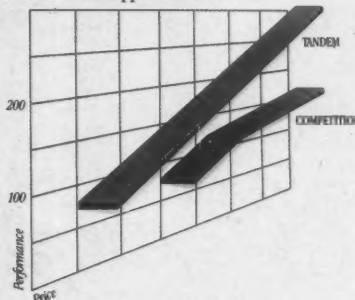


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To add power, just add processors. You can grow from a base four-processor system to 16. From there, you can expand in whatever increments you choose, all the way to 255 systems. You never buy more than you need, and you'll never have to rewrite a line of applications code.



NO-FAULT INSURANCE.

Tandem systems achieve fault-tolerance with a unique, parallel processing architecture. There are no idle back-up components. Instead, multiple components share the workload. If one goes down, the others pick up the slack, and application processing is uninterrupted.

HERE TODAY. HERE TOMORROW.

The VLX is compatible with any Tandem system and with all major communications standards — SNA, X.25, MAP and O.S.I. And by acting as a gateway to other vendors' systems, the VLX can link them and enhance their value as well.

WE HAVE EXCELLENT REFERENCES.

Tandem systems are already at work for Fortune 500 companies in banking, telecommunications, manufacturing, transportation, retailing and energy, as well as several branches of the U.S. Government.

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AT&T offers another clear-cut reason for selecting the PC 6300 PLUS: Its highly defined, easy-to-read screen resolution. Compared to the IBM PC AT, the PC 6300

PLUS text and graphics are four times sharper. Whether you're working on sales charts or preparing presentations, getting a better picture helps communicate the big picture.

Our non-glare screen and tilt-and-swivel monitor allow you to work comfortably on the PC 6300 PLUS for hours at a time. Its sleek design enables this unusually powerful PC to fit easily on your desk. Again, next to all the major competitors, AT&T's PC takes up 40% less desk space.

PERSONALITY PLUS

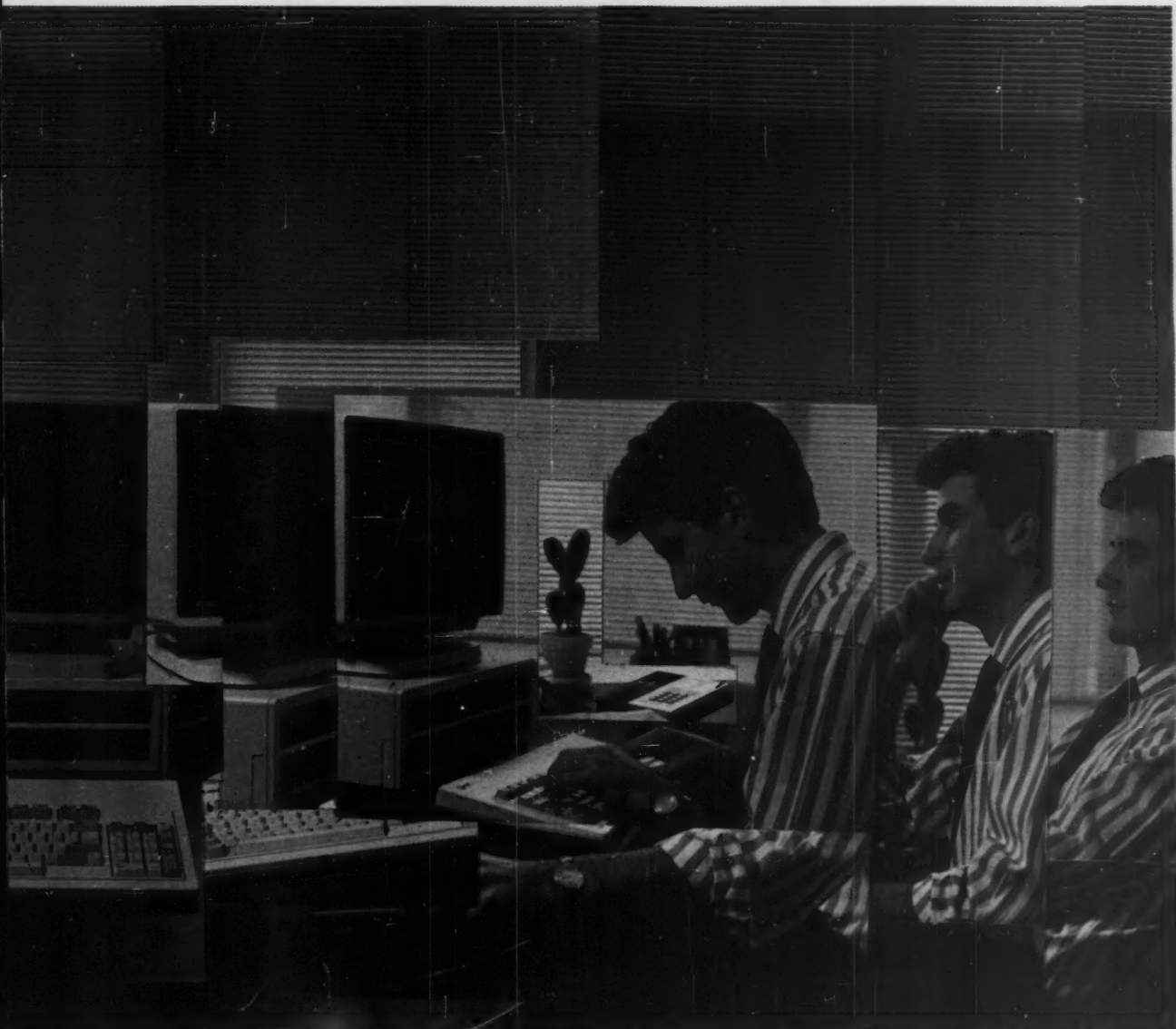
There's more to AT&T's PC 6300 PLUS

than sheer power and comfortable design.

There's a side no one's ever seen before. It's a special feature on the PC 6300 PLUS called Simul-Task which lets you do things on a desktop computer that other PCs only hope to do someday: it works the way you work.

Say, for example, you are working on a spreadsheet and need the latest stock quotes. Simul-Task enables you to call up the new information and return to your original program in a fraction of the time it would normally take. You'll soon be able to activate Simul-Task.

When you are ready to protect your work, the PC 6300 PLUS enables you to eas-



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WITH THE MULTIPLE PERSONALITY.

ily make backup files while you continue on with other things. You can also schedule programs to run while you're away from your machine, so when you return, all the information will be waiting for you. The PC 6300 PLUS even affords you the convenience of sending and receiving electronic mail in the background while you run another program in the foreground.

THE COMPUTERS WITH THE FUTURE BUILT IN

The combination of high performance and unique features makes the AT&T PC 6300 PLUS the personification of PC invest-

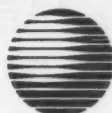
ment protection. Without abandoning the software you already own, you are bringing some extraordinary new capabilities to your desktop.

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All the more reason why the PC 6300 PLUS may very well be suited to your personality.

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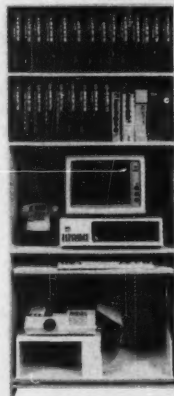
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NEW PRODUCTS/MICROCOMPUTERS

Gessler Educational Software has announced two foreign language word processing programs, **Alexander and Gutenberg**.

Alexander has multilingual symbols for French, Spanish, German, Italian, Greek, Hebrew, Russian and English.

It is also equipped with the symbols used in science and math notation, music composition and electronic schematics.

Alexander runs on the IBM Personal Computer, AT&T Personal Computer 6300 and Compaq Computer, Inc. compatibles.

Gutenberg offers formats in 13 different languages. It runs on the Apple Computer, Inc. II+, IIe and IIc, according to the vendor.

Alexander costs \$245. Gutenberg costs \$99.95.

Gessler Educational Software, 900 Broadway, New

York, N.Y. 10003.

Gessler Education Software has introduced **Passport, Prompt and Questionmaster**, three computer software authoring systems for foreign language curriculum use.

Passport was designed for creating courseware for learning French, Spanish, German, Russian, Hebrew, Japanese and 13 other languages.

It runs on the Apple Computer, Inc. II family.

Prompt is for lessons in English as a second language, French, German, Italian and Latin. It runs on the IBM Personal Computer and PCjr.

Questionmaster reportedly allows the teacher to construct interactive teaching and testing programs for learning French, German and

English as a second language. It also runs on the Apple II family.

Prices for Passport, Prompt and Questionmaster are \$195, \$150 and \$69, respectively.

Gessler Educational Software, 900 Broadway, New York, N.Y. 10003.

Rainbow Software Systems has introduced **Client Plus**, a program said to help users manage client development and marketing activities.

The program is said to organize client profiles, sort personal contacts, track referral sources, target prospects, provide for follow-up letters, monitor weekly marketing activities, calendar events and create a library of articles and speeches.

Client Plus has two sections: files and reports. It runs on IBM Personal Computers and compatibles with 348K bytes of memory, a single diskette drive and a hard disk drive, according to the vendor.

The program costs \$495. Rainbow Software Systems, 23832 Bluehill Bay, Laguna Niguel, Calif. 92677.

Oakland Group, Inc. has announced **C-scape**, a screen generator for C developers designed for use on the IBM Personal Computer.

C-scape reportedly allows users to create input editing screens and menus in the C language.

It has syntax that extends C's Print-F function to include a menu definition language that allows screen addressing, field definition and data action and validation.

C-scape can be used directly with Bricklin's Demo Program, allowing users to create source code without having to re-enter such codes as screen contents and window coordinates, the vendor said.

C-scape costs \$149. With the Demo Program, it costs \$219.

Oakland Group, 675 Massachusetts Ave., Cambridge, Mass. 02139.

Software utilities

General Micro Systems has added **PC220** to its line of terminal emulation packages.

PC220 provides full keyboard and screen emulation of Digital Equipment Corp. VT220, 200, 102, 101, 100 and 52 terminals. It runs on the IBM Personal Computer, Personal Computer XT, AT and compatibles.

Up to 30 soft keys can be defined. Scripts can be attached to keys or can be executed automatically when PC220 loads, according to the vendor.

An autodial directory is included as well as a shell key.

PC220 costs \$169.

General Micro Systems, P.O. Box 5330, 991 Valley View Road, Eden Prairie, Minn. 55343.

Colin James III has announced the **Algorithm of Syntactical Mnemonics (ASM)**, software intended to reduce the space and time needed for data transmission and storage.

ASM is said to be a one-pass data contraction software product. According to the vendor, it does not use compression, global search, packing, shifting or suppression. It reportedly offers direct throughput without buffering or I/O. It contracts alphanumeric data and processes data at a rate of 106K to 285K bit/sec. on an Intel Corp. 80286 at 8 MHz.

A corporate license costs \$1,000; per division site, the cost is \$100 a month. There is a \$1 royalty per personal computer disk sold.

Colin James III, Box 4, 480 S. Vine St., Denver, Colo. 80209.

Panasonic Industrial Co. has announced a **software tool** for its 32-ounce Personal Partner hand-held computer.

The software development tool is said to allow developers to create and test custom applications programs on any Microsoft Corp. MS-DOS computer then download the programs to the Personal Partner.

According to the vendor, programs can be developed in the Forth programming language or in Intel Corp. 8088 assembly language.

Applications can be run and debugged on the MS-DOS computer or directly in the Personal Partner via a random-access memory/read-only memory hardware device.

The software costs \$1,995. Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

General Optimization, Inc. has announced the **What's Best Personal Version** for personal computers.

What's Best is a spreadsheet optimization program. The personal version is not copy protected, and it runs on 256K bytes of random-access memory. According to the vendor, it can optimize spreadsheets with up to 800 numeric cells. Up to 250 of these cells can be variable.

What's Best Personal Version is priced at \$149. Other versions available include the Commercial Version for \$695 and the Professional Version for \$995.

General Optimization, 2251 N. Geneva Terr., Chicago, Ill. 60614.

Software data base management systems

Tominy, Inc. has released a version of its **Databasicplus** Basic data base manager, said to interface with the IBM Basic language version 3.2.

Databasicplus reportedly gives a programmer the ability to access a full logical data base system from the Basic programming language. According to a company spokesman, record holding logic, data independence, dynamic space allocation and data access by indexed and sequential keys are standard.

Databasicplus also supplies utilities to create and maintain the data base.

Databasicplus runs on IBM PC-DOS-compatible systems. It costs \$99.95.

Tominy, 4221 Malsbury Road, Cincinnati, Ohio 45242.

Software enhancements

Metasoft Corp. has released **The Benchmark Word Processor Version 4.5** for the IBM family of Personal Computers, the NEC Corp.

Continued on page 100

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 99

APC and APC III, the Victor Technologies, Inc. 9000 and the Digital Equipment Corp. Rainbow.

Added features include the ability to include full-featured graphics in documentation or window-marked text in the Benchmark Graphics and enhanced cursor movement control; printer HEX codes can be imbedded within text. ASCII files from data base management systems can be inserted into a form document, and spreadsheet data can be imported into text.

Prices range from \$149 to \$695.

Metasoft, Suite 12, 6509 W. Frye Road, Chandler, Ariz. 85226.

package for users of streaming tape systems utilizing the Everex controller.

Version 4.0 performance improvements include the ability to conduct file-by-file operations at close to streaming speed.

Additional performance improvements are such features as performing backup on multiple backup sessions on the same tape and reduced storage requirements, according to the vendor.

Other features include movable nesting windows, on-line Help and a general-purpose notebook program.

Version 4.0 is priced at \$150.

Everex Systems, 48431 Milmont Drive, Fremont, Calif. 94539.

released Version 2.2 of its Timeslips memory-resident time and billing system for the IBM Personal Computer and compatibles.

Timeslips 2.2 includes added flat-fee billing options and the ability to adjust a bill up or down by a flat dollar or percent amount and reports on account billing history by month and year to date.

The system also includes added description of the work performed on the automated time record and a function key that reportedly allows users to duplicate any field on a time slip.

Timeslips 2.2 is priced at \$99.95. North Edge Software, P.O. Box 286, Hamilton, Mass. 01936.

Tapestry Starter Packs consisting of a Tapestry Network Manager Pack and a Workstation Pack.

According to the vendor, Starter Packs provide enough software for a full-functioning two-station network.

Tapestry is network operating software. It features an icon-based user interface that integrates electronic mail, file and printer sharing and communications gateways, the vendor said.

Tapestry Starter Packs are priced at \$295 each.

Torus Systems, Suite 105, 495 Seaport Court, Redwood City, Calif. 94063.

Everex Systems, Inc. has announced Version 4.0, a software

North Edge Software Corp. has

Communications

Torus Systems has announced

Intelligent Technologies International Corp. has released **Modem Exchange**, a micro-to-mainframe communications product.

The Modem Exchange board features a 4.8K bit/sec. AT&T 208 A/B compatible modem. It plugs into any IBM Personal Computer or compatible expansion slot.

Using a standard phone line and the Modem Exchange software, the user can access any software application running in the Systems Network Architecture environment, including IMS, CICS and TSO/IPF, according to the vendor.

Modem Exchange features auto-dial for pulse or tone dialing of up to 36 digits in attended or unattended modes.

Modem Exchange is priced at \$1,995.

Intelligent Technologies International, 737 Lincoln Centre Drive, Foster City, Calif. 94404.

Galacticomm, Inc. has announced the **Galacticomm Breakthrough**, a 16-channel modem card for the IBM Personal Computer XT, AT and compatibles.

Together with the Software Breakthrough object library, Galacticomm Breakthrough can support up to 64 simultaneous users at a rate of 300 or 1,200 bit/sec., according to the vendor.

The software is IBM PC-DOS compatible, the vendor said.

Galacticomm Breakthrough costs \$7,450, including card, adapter, cable and software.

Galacticomm, 11360 Tara Drive, Plantation, Fla. 33325.

Data storage

Priam Corp. has introduced the **External Disk (ED)** and the **External Tape (ET)** series of desktop storage systems for the IBM Personal Computer family of microcomputers and compatibles.

The ED series consists of a 5¼-in. Winchester disk drive available in 43M, 60M or 103M bytes, interface card, installation and utility software and cables, according to the vendor.

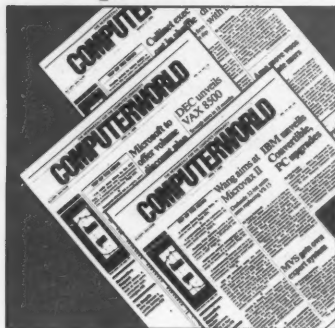
The ET series consists of a 60M-byte, ¼-in. streaming tape drive, a removable tape cartridge, controller card, installation software and cables.

The ED series is priced from \$1,695 to \$2,995.

The ET series can be purchased for a price of \$1,895.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

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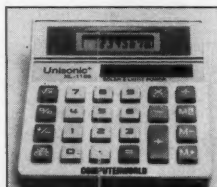
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NEW PRODUCTS/MICROCOMPUTERS

Printers/Plotters/
Peripherals

Output Technology Corp. has announced the OT-700N near-letter-quality printer.

The OT-700N has a draft speed of 200 line/min. and offers near-letter-quality Helvetica font styling with 10-pitch printing at 25 to 51 char./sec.

Other features are said to include dual-mode dot-addressable graphics, front-panel menu programming,

8K-byte buffer and front and bottom paper feed.

According to the vendor, multipitch printing up to 16.6 char./in., Epson America, Inc. FX and Digital Equipment Corp. LA-120 emulation as well as both serial and parallel interfaces are also featured.

The OT-700N near-letter-quality printer is priced at \$2,095.

Output Technology, Bay #33, E. 9922 Montgomery, Spokane, Wash. 99206.

ITT Qume has announced the **Profeeder 2EM** sheet-feeder.

The sheetfeeder was designed for users with large multipage and envelope addressing projects. It automatically snaps into the ITT Qume Sprint 11 Plus series daisywheel printers.

It is a demand-feed system with dual input bins and integral envelope feeder, which allows simultaneous printing of multipage documents and their envelopes.

The **Profeeder 2EM** is priced at \$1,195.

ITT Qume, 2350 Qume Drive, San Jose, Calif. 95131.

Applied Data Communications has introduced the **RDH 3.5 L/L Robotic Disk Handler**, said to load automatically, copy and apply wraparound labels to 3½-in. diskettes.

The disk handler can apply labels to as many as 100

diskettes per batch. It features both serial and parallel interfaces, enabling it to copy data from a host computer or from any of the vendor's duplication systems. It accepts a roll of up to 1,000 preprinted labels.

According to the vendor, the device also accommodates the requirements of Apple Computer, Inc.'s Macintosh and other 3½-in.-based systems.

The disk handler costs \$12,995.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680.

COMMUNICATIONS

Controllers

Black Box Corp. has introduced the **Black Box MNP Error Controller**.

The device is a networking protocol said to allow data communication between personal computers, networks or mainframes. When it detects a transmission error, it automatically returns that data block.

The device operates in three switch-selectable modes. It can communicate only with systems that use the Microcom Networking Protocol (MNP) error-checking protocol and automatically determine if the error-checking standard is active at the receiving end. The system can also operate as though the device were not present.

Priced at \$295, it can transmit data rates of 300, 1,200 or 2,400 bit/sec.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241.

Standard Microsystems Corp. has introduced the **Arcnet-PC300** fiber-optic local-area network controller board.

The board incorporates the Raycom Systems, Inc. Raycom 3101 fiber-optic transceiver driver, the Standard Microsystems' COM9026 local-area network controller and the COM9032 Arcnet local-area network transceiver large-scale integration chip. It features a 2K-byte on-board data packet buffer and an on-board 8K-byte programmable read-only memory socket.

The Arcnet-PC300 is priced at \$995.

Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Voice/data
communications

Infotronics Systems Corp. has introduced its **Integrated Data Voice Multiplexer (IDVM)**, a data-over-voice system said to take advantage of

Continued on page 104



Oh, the joys of being a DP professional.

Every job has its share of problems. But DP professionals seem to be blessed with more than their fair share.

We can help you do away with some of the grief and hassle. Things such as JCL errors, production foul-ups, and maintenance problems.

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you the hours, days, even weeks now spent manually searching listings. It makes possible better scheduling, reliable contingency planning, and faster disaster recovery.

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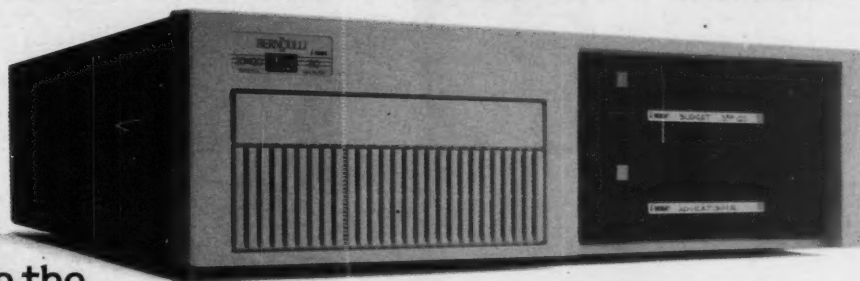
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Triangle Software Company

4340 Stevens Creek Blvd., Suite 275
San Jose, CA 95129

Announcing the Bernoulli Box Plus.TM



It took Bernoulli
Technology to take the
limits off hard disk.

Introducing the Bernoulli Box Plus: a mass storage subsystem that gives users increased data availability on-line; infinite data expandability; and the versatility to manage everything from sophisticated networks (LAN) to power-user applications.

The Bernoulli Box Plus combines an 80-MB hard disk drive with two 20-MB drives that utilize high performance, removable Bernoulli disk cartridges. The two technologies are housed in a single external subsystem, providing a singular set of performance features and user benefits.

First, is the fact that the Bernoulli Box Plus is not simply an all-disk equivalent to hard disk with tape back-up. Bernoulli drives are high performance devices that run data as fast as your PC will allow. Speeds are identical whether you're using data housed on the hard disk drive or the Bernoulli drives. *More important—the Bernoulli drives represent removable, on-line, random-access storage.* So critical files can be created on cartridge; saved on cartridge (down to the most recent model or key stroke); transported on cartridge; backed up on cartridge (from another cartridge or from the hard disk); and secured on cartridge (in a desk drawer).

In data-intensive applications—such as computer-aided design and computer-aided engineering—the Bernoulli drives' on-line capabilities mean that operating systems and applications software can reside on the hard disk while other functions are brought on-and off-line via cartridges as needed.

The cartridges—infinitely expandable and strategically manageable by project or department—reduce capacity demands on the hard drive, boosting hard drive

throughput and long-term utility.

In addition, the cartridges provide the transportability and security that have helped make Bernoulli technology the new standard in mass storage solutions.

For the network user—the Bernoulli Box Plus represents the most sophisticated storage concept ever introduced. It can be used by many workstations—as a file server—or by any individual workstation. Again, the on-line capability of the Bernoulli drives permits efficient management of the hard disk's limited storage capacity. The Bernoulli Box Plus supports both PC NET and NOVELL networking environments and is compatible with any PC running under the IBM PC Network program.

Mainframe data management in the micro environment. Continuous availability of primary storage; immediate access to secondary files. This strategic structure—perfected in mainframe and mini environments—extends the capacity of hard disk and increases overall subsystem speed, reliability, transportability and versatility.

Hard disk capacity has finally come to a better end—with the beginning of the Bernoulli Box Plus.

For additional information, please call 1-800-255-5550, Extension 458.



OMEGA
BERNOULLI TECHNOLOGY

NEW PRODUCTS/COMMUNICATIONS

Continued from page 102

tage of unused bandwidth on existing telephone lines to transmit both voice and data simultaneously.

The IDVM consists of a station unit and filters. It works with analog or digital private branch exchanges or Centrex-type telephone switching systems. It features an RS-232 interface.

The IDVM costs \$450 per connection.

Infotron, Cherry Hill Industrial Center-9, Cherry Hill, N.J. 08003.

Honeywell, Inc. has introduced the **Delta-Plex Series 100** electronic six-wire, key-telephone system.

Based on two processing units, the Delta-Plex 100 family offers three models. The Delta-Plex 101 serves users with up to 16 stations; the Delta-Plex 102 services up to 32 stations; and the Delta-Plex 103 serves up to 64 stations.

Any station or group of stations may be programmed to appear on one instrument or group of instruments.

The series costs \$450 to \$700 per station line.

Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

Protocol converters

Perle Systems, Ltd. and **GSD Systems, Inc.** have announced an **RS-422 capability** for Perle's 350 family of protocol converters.

The family includes the 350/294 unit for the IBM System/34, 36 and 38 and the 350/327 unit in two models that provide IBM 3270 systems network architecture/binary synchronous control and 3770 protocol conversion for mainframe systems.

It allows from four to 40 asynchronous terminals, printers and personal computers to be interfaced to IBM System/34, 36 and 38 or mainframes.

The RS-422 option costs \$200 per four ports.

GSD Systems, Suite 507, 600 S. Dearborn St., Chicago, Ill. 60605.

Software

EKD Computer Sales & Supplies Corp. has announced **PCanywhere**, said to allow any terminal or personal computer with a modem to access an IBM Personal Computer, Personal Computer XT, AT or compatible remotely.

The remote user is said to have full keyboard control over all PC functions including access to printers, other peripherals and data on floppy or hard disks. Up to 16 passwords can be specified, and an initial command line can automatically run a program at logon.

PCanywhere is said to

support up to 32 different terminal makes. Features include bidirectional file transfer, electronic mail message and access to network functions of Novell, Inc.'s Advanced Network.

PCanywhere costs \$95. EKD, 764 Middle Country Road, Selden, N.Y. 11784.

Codex Corp. has announced the **Codex Communications Test Equipment**

(CTE) software for its 2600 series of high-speed modems.

The software is said to allow users to run the circuit quality tests used by Bell technicians on leased lines.

According to the vendor, it integrates the features of a transmission impairment measurement set and remote data scope to analyze line impairments and monitor, collect and analyze data traffic on a circuit.

The user can also evaluate protocols to determine poten-

tial errors and mismatches.

The CTE software is priced at \$1,500.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

Multiplexers/Modems

Able Computer has introduced the **QHV** and the **QHV Plus** multiplexers for Digital Equipment Corp. Microvax II and other Q-bus-based systems.

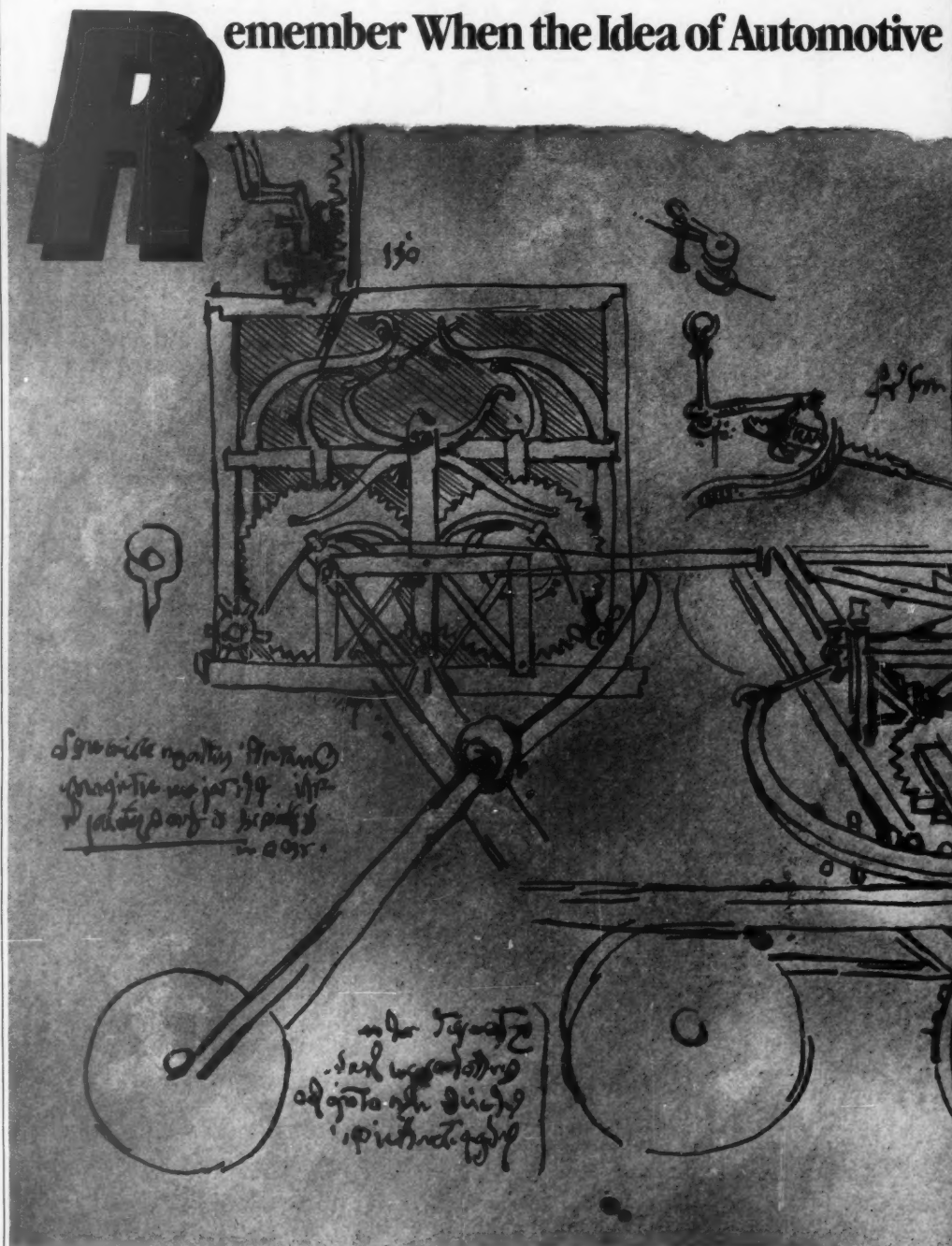
The QHV is an eight-line asynchronous multiplexer,

said to be fully compatible with DEC's DHV/11. It allows direct memory access or single programmed transfers.

The QHV Plus is a 16-channel multiplexer. It is compatible with the DHV/11 and includes all standard DEC emulation features.

The QHV costs from \$1,195 to \$1,395. The QHV Plus costs \$1,495 or \$1,695 with panels.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.



NEW PRODUCTS/SYSTEMS & PERIPHERALS

SYSTEMS
& PERIPHERALS

Terminals

Seiko Instruments USA, Inc. has introduced the **GR-1105** color graphics display terminal.

The display terminal is said to execute 4,500 short vectors per second from display-list memory. It also features a 14-in. 1,024- by 780-pixel resolution screen and a

32,768- by 32,76-point coordinate space.

The GR-1105 terminal is priced starting at \$4,995.

Seiko Instruments USA, 1623 Buckeye Drive, Milpitas, Calif. 95035.

Intecolor Corp. has announced the **Colortrend 4100 Model 100**, a terminal for data representation and analytical applications.

The terminal provides 249

different fill patterns, a tube dot pitch of 0.31mm, 16 colors and throughput up to 38.4K bit/sec.

The Colortrend 4100 comes with a mouse, detachable keyboard and programmable function keys.

The terminal costs \$2,695. Intecolor, 225 Technology Park, Norcross, Ga. 30092.

Monitronix Corp. has announced the **MX-4190** ultra-

high-resolution color monitor.

The 19-in. analog red-green-blue monitor features 60Hz noninterlaced refresh rates. It offers 1,600- by 1,280- pixel displayable resolution at 0.25mm pitch. Horizontal scan rates are user-specifiable from 40 kHz to 80 kHz.

The MX-4190 monitor is priced from \$5,995.

Monitronix, 2971 Silver Drive, Columbus, Ohio 43224.

Printers/Plotters

Olympia USA, Inc. has introduced its **Olympia XL 120** and its **XL 121 with Spell Check**, two portable electronic typewriters.

The XL 121 with Spell Check features an on-board 80,000-word dictionary. A personal dictionary of 300 words can also be created.

Both models feature 40-char. correction memory for automatic lift-off of errors from the page, automatic return for uninterrupted typing, automatic centering, automatic decimal tabulation, special horizontal and vertical spacing capabilities and print enhancements, including bold print and underlining.

The XL120 costs \$319, and the XL 121 with Spell Check costs \$399.

Olympia U.S.A., Box 22, Somerville, N.J. 08876.

Xpoint Corp. has announced the **6224** rugged dot matrix printer for use with IBM's System/34, 36 and 38 computers.

According to the vendor, the 6224 can emulate IBM's 5225 and 5256 printers in local or remote settings, connecting through standard twin-axial cables.

The dot matrix printer is said to support all IBM software except APL. In place of APL, Xpoint features a firmware package called Feature Control.

According to the vendor, Feature Control provides proportional printing and letter-quality modes, 16 foreign character sets, 10 character sizes and a range of bar code options.

Xpoint 6224 is priced at \$4,850.

Xpoint, Suite 130, 5600 Oakbrook Pkwy., Norcross, Ga. 30093.

Dyna Five Corp. has announced the **Digital Equipment Corp. Q-bus-compatible D5-LP100** line printer controller.

The controller is said to offer a 300,000-char./sec. data transfer rate. Other features are said to include switch-selectable device addresses, switch-selectable interrupt address vectors, parallel interfaces and adjustable data strobe timing.

According to the vendor, the D5-LP100 line printer controller operates in Q16, Q18 and Q22 bit-address backplane and is transparent to DEC software.

It is a dual-height board said to be Centronics Data Computer Corp. and Data-products Corp. compatible.

The D5-LP100 is priced at \$140.

Dyna Five, 12040 Western Ave., Garden Grove, Calif. 92641.

Transportation Couldn't Get Out of First Gear.

As you can see from the accompanying illustration, the differential transmission wasn't the brainchild of Detroit.

No, it was more like Italy. And the engineer was none other than Leonardo Da Vinci.

Needless to say, talking differential transmissions over a plate of pasta in the 15th century was not altogether fashionable and, naturally enough, was met with some skepticism.

Today, of course, the American love affair with the car is rather evident. We couldn't live without it.

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Communications Service Assurance represents a single source for problem detection, diagnosis and preventive monitoring, as well as expediting restoration of your corporate communications. It helps with expansion and alteration and gives you customized services.

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And, yes, we'll keep you rolling in the right direction.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Houston Instrument has introduced the **DMP-29**, an intelligent 11-in. by 17-in., eight-pen plotter featuring a maximum pen speed of up to 22 in./sec.

The **DMP-29** features Houston Instrument's DM/PL resident plotter language. It will define window limits, scale plots, vary line intensity, produce European character sets and automatically describe circles, ellipses and general curves.

The **DMP-29** costs \$2,295. Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

Printek, Inc. has introduced the **Formspro 2000** printer for multipart forms printing.

The printer offers 200 char./sec. print speed and incorporates an 18-pin print head. It accommodates forms up to 13.6-in. wide and from 1-in. to 24-in. long. According to the vendor, print quality from the first through the ninth part is clear and legible.

The **Formspro 2000** costs \$2,195. Printek, 1517 Townline Road, Benton Harbor, Mich. 49022.

Houston Instrument has introduced the **True Grid** line of seven digitizers featuring standard RS-232C-compatible interfaces.

The 1000 series was designed for cursor control and menu-picking applications. Features include resolution of 0.005 in.; choice of transducers and active areas of 5-in. by 5-in., 11-in. by 11-in. and 11-in. by 17-in.

The 8000 series targets mechanical, electrical, surveying, mapping and architectural applications. Features include resolution of 0.001 in.; choice of transducers; and active areas of 11-in. by 11-in., 11-in. by 17-in., 18-in. by 24-in. and 24-in. by 36-in.

Prices for the 1000 series range from \$495 to \$975. For the 8000 series, prices range from \$1,150 to \$4,340.

Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

Facit, Inc. has announced a bar code option for its Opus 1 laser printer.

The bar code version was designed to extend the word processing and correspondence printing of the standard Opus 1 in multiuser business environments. It can print on pressure-sensitive, temperature-resistant labels and on letter-size paper.

The printer can print at 12 page/min. and offers a print resolution of 300 by 300 dot/in.

The bar code version of the Facit Opus 1 costs \$9,500.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

The 14-pen **DMP-51/52 MP** series plotters from Houston Instrument are said to feature a resolution of 0.001 in., a maximum plotting speed of 22 in./sec. and user-selectable acceleration.

The series was developed for architectural, engineering, scientific and other drafting-intensive applications. The plotters are C- and D-size and contain Houston Instrument's

built-in DM/PL plotting language.

The **DMP-51/52 MP** series costs \$6,495.

Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

Houston Instrument has added the **E-size DMP-56** to its family of professional drafting plotters.

The **DMP-56** plotter is said to accommodate 18 different media sizes, ranging from 8½-in. by 11-in. to 36-in. by 48-in. It is said to produce architectural designs, engineering schematics, mechanical drawings and overhead transparencies.

The **DMP-56** features a resolution of 0.001 in. and a maximum plotting speed of 17 in./sec. It can be interfaced with any computer featuring a standard RS-232C-compatible port.

The **DMP-56** costs \$5,995.

Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

Versatec, Inc. has announced the **Model 810** raster processing machine, a single microprocessor-based rasterizer.

The **Model 810** is said to drive Versatec electrostatic color and monochrome plotters.

It is a 32-bit microprocessor with 2M bytes of on-board memory.

According to the vendor, the **Model 810** was designed to off-load data ordering and rasterization from the host computer.

The **Model 810** raster processing machine is priced at \$7,950.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

Power Supplies

Sola, a unit of General Signal, has announced a series of 5, 7.5, 10 and 15 kVA uninterruptible power systems.

The systems are said to feature fourth-generation electronic pulse-width modulation inverters.

The models operate continuously from the inverter, with on-line battery reserve. Each system can handle a 125% overload for 60 min without drawing current from the battery. Battery reserve times at full load are 12 min for the 5 kVA model, 6 min for the 7.5 kVA model and 3 min for the 10 kVA model. The 15 kVA model is dependent on the battery.

Prices range from \$12,200 to \$24,800.

Sola, 1717 Busse Road, Elk Grove Village, Ill. 60007.



IF YOU GET ENOUGH PEOPLE

YOU CAN HELP CHANGE

The Travelers employs nearly 3,000 dedicated people in data processing.

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Computer Power Systems Corp. has announced the Series 2000 power distribution and regulation system for mini and supermini systems.

The Series 2000 is semiconductor based and is said to cope with power irregularities such as surges, sags, transients and brownouts.

A single-phase model and a three-phase model are available. According to the vendor, both offer monitoring of the user's computer-room temperature and humidity and tap switching.

In addition, all I/O cables can be connected to either the back or front of the unit.

Prices for the Series 2000 power distribution and regulation system range from \$5,000 to \$10,000.

Computer Power Systems, P.O. Box 6240, 18150 S. Figueroa St., Carson, Calif. 90749.

L/F Technologies has introduced the L/F-Power II integrated uninterruptible power supply for the vendor's Ultima terminals.

The L/F Power II resides within the terminal case. It is reportedly preconfigured to provide the exact level of DC power required by the Ultima terminal in the event of a power disturbance. It provides up to one hour of battery backup power.

The L/F Power II is priced at \$150. L/F Technologies, 2800 Lockheed Way, Carson City, Nev. 89701.

Sorenson Co. has introduced the DCR-T series of three-phase, 10-kW, DC-regulated power supplies for controlled test and burn-in applications.

The DCR-T is said to protect loads from current and voltage caused by

open programming lines. It separates remote programming from remote sensing, eliminating the possibility of voltage breakdown across output components.

Standard input is 480V AC at 60Hz. The DCR-T is remote controllable. The units fit into standard 19-in. racks.

The DCR-T units are priced at \$3,900.

Sorenson, 676 Island Pond Road, Manchester, N.H. 03103.

Auxiliary equipment

Rediform has introduced thermal transfer computer paper for use with thermal transfer printers.

According to the vendor, the paper offers extra-smooth quality that enables wax-based inks to transfer onto the sheet without cracking, flaking

or rubbing off.

Rediform's computer paper costs \$8.99 for a 250-count pack.

Rediform, W-53 Century Road, Paramus, N.J. 07652.

PRICE REDUCTIONS

Priam Corp. has cut the prices for its 43M- and 60M-byte Innerspace internal disk add-in kits for the IBM Personal Computer family.

The kits consist of a 5¼-in. Winchester disk, an optional controller, Priam software and utilities and cables.

The reduced prices are as follows: ID40-AT/XT costs \$1,398; ID40-PC costs \$1,698; ID60-AT/XT costs \$1,798; and ID60-PC costs \$1,098.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

Interleaf, Inc. has announced a price reduction for its electronic publishing system running on Digital Equipment Corp.'s Vaxstation II.

Including laser printer, the system is available now for \$29,900. Also included is Interleaf's electronic publishing software, TPS; DEC's Vaxstation II system configuration with 3M bytes of memory, 71M-byte Winchester disk and 95M-byte streaming tape cartridge; and all fonts.

Interleaf, Ten Canal Park, Cambridge, Mass. 02141.

General Business Technology, Inc. has announced a price reduction on both the 5220DP and the 5222DP dual-purpose matrix printers.

Both printers are said to feature adjustable tractor feed with tear bars as well as a variety of user-programmable or host-selectable character fonts and styles.

The 200 char./sec. 5222DP is now priced at \$2,495, and the 400 char./sec. 5220DP is now priced at \$4,450.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714.

RPG V S/38 Fifth Generation Code Generator

New from Help/38, the RPG V System will cut your coding by 80%. It lets you enter RPG V code in SEU, and then it generates RPG III instantly. It also checks for syntax errors on the spot. Plus more:

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NEWS



CALENDAR

WEEK OF JUNE 1

JUNE 2-5, DETROIT — **Vision '86 — Applied Machine Vision Conference and Exposition.** Contact: Vision '86 Public Relations, Machine Vision Association of the Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 2-5, NASSAU BAY, TEXAS — **International Symposium on Ada Programming Language Applications for Space Station Development.** Contact: University of Houston — Clear Lake, 2700 Bay Area Blvd., Houston, Texas 77058.

JUNE 2-6, NEW YORK — **Communications Week '86.** Contact: Merle Pilkins, Conference Manager, Datapro Research Corp., McGraw-Hill Information Systems Co., 1221 Avenue of the Americas, New York, N.Y. 10020.

JUNE 4, SAN FRANCISCO — **How to Build Your High Tech Career Network.** Contact: Association for Women in Computing, Bay Area Chapter, Suite 44, 55 Sutter St., San Francisco, Calif. 94104.

JUNE 4-6, BOSTON — **Engineering Expert Systems.** Contact: Harmon Associates, 151 Collingwood, San Francisco, Calif. 94114.

JUNE 4-6, SAN DIEGO — **1986 National Educational Computing Conference.** Contact: Susan M. Zgliczynski, National Educational Computing Conference 1986, School of Education, University of San Diego, Alcalá Park, San Diego, Calif. 92110.

JUNE 5-6, CLEVELAND — **North Central Region Data Processing Trainer's Conference.** Contact: Gary Livingston, Livingston & Associates, P.O. Box 30619, Cleveland, Ohio 44130.

JUNE 7, BEIJING — **China-Didacta '86: The International Trade Fair for Educational Equipment.** Contact: Swiss Industries Fair, Secretariat China Didacta '86, P.O. Box CH-4021, Basel, Switzerland.

JUNE 7-8, BOSTON — **Massachusetts Health Data Consortium 3rd Annual Computer Expo and Conference.** Contact: Massachusetts Health Data Consortium, Inc. 400-1 Totten Pond Road, Waltham, Mass. 02154.

WEEK OF JUNE 8

JUNE 8-11, NEW ORLEANS — **Ethernet Decision-Makers Group Exchange Conference.** Contact: EDGE International, Inc., Suite 260, 1539 N. China

Lake Blvd., Ridgcrest, Calif. 93555.

JUNE 8-11, TORONTO — **World Computing Services Industry Congress V.** Contact: Co-Ordination Plus, Inc., Suite 2102, 65 Queen Street W., Toronto, Ont., Canada M5H 2M8.

JUNE 9-10, TEANECK, N.J. — **Machover on Business Graphics.** Contact: Carol Every, Industry Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

JUNE 9-11, MYRTLE BEACH, S.C. — **The Association of Small Computer Users in Education 19th Annual Summer Conference.** Contact: Jack Cundiff, Horry-Georgetown Technical College, Conway, S.C. 29526.

JUNE 9-11, NORCROSS, GA. — **Time and Motion Study Fundamentals.** Contact: Institute of Industrial Engineers Registrar, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JUNE 9-12, BOSTON —

Network Management/Technical Control Conference and Exposition. Contact: CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

JUNE 9-12, CHICAGO — **Com Lease Spring, The Computer Leasing Conference and Expo.** Contact: Show Management Offices, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

JUNE 9-13, SAN DIEGO — **MUMPS Users' Group**

15th Annual Meeting. Contact: MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 10-13, ATLANTA — **Summer 1986 Unix Conference and Exhibition.**

Contact: The Usenix Association Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

JUNE 11, NEW YORK — **The Semiconductor Industry — Its Changing Structure** — See CALENDAR page 110

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NEWS

CALENDAR from page 109

ture 1986. Contact: Robert Burton, L. F. Rothschild, Unterberg Towbin, 55 Water St., New York, N.Y. 10041.

JUNE 11-13, MAINZ, WEST GERMANY — International Tandem Users' Group 1986 Spring Conference. Contact: ITUG Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

JUNE 11-13, TEANECK, N.J. — Machover on CAD/CAM. Contact: Carol Every, Industry Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

WEEK OF JUNE 15

JUNE 15-20, LONG BEACH, CALIF. — 1986 Government Management Information Sciences Conference. Contact: Tom Lang, Assis-

tant Chairman, Data Processing Department, 9150 E. Imperial Highway, Downey, Calif. 90242.

JUNE 16-18, UNIVERSAL CITY, CALIF. — Synergy '86, Conference on Functional Interfacing for Computer-Integrated Manufacturing. Contact: Cheri Willetts, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 16-19, LAS VEGAS — The 1986 National Computer Conference. Contact: National Computer Conference, 1899 Preston White Drive, Reston, Va. 22091.

JUNE 16-20, CAMBRIDGE, MASS. — Managing Information Technology: New Responsibilities in a Changing Environment. Contact: Center for Information Systems Research, Sloan School of Management, MIT, E40-193, 77 Massachu-

setts Ave., Cambridge, Mass. 02139.

JUNE 17-18, PLYMOUTH, MICH. — Robotic End Effectors: Design and Applications Seminar. Contact: Mary Dombrowski, Special Programs Division, Robotics International of the Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 18-20, TOKYO — Marketing Opportunities Seminar. Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — Management Information Systems for Strategic Advantage. Contact: The Registrar, Office of Executive

Education, 200 Vance Hall, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-25, ALBUQUERQUE, N.M. — Integrated Fiber-Optic Technology Training. Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176.

JUNE 23-25, MIAMI — Electronic Data Processing Auditors Association 14th Annual International Conference. Contact: EDPAA, P.O. Box 88180, Carol Stream, Ill. 60188.

JUNE 23-26, BOSTON — ATE East '86. Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JUNE 23-27, AMSTERDAM — Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition. Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

JUNE 23-27, CHICAGO — A/E/C Systems '86: The Computer and Management Show for the Design and Construction Industry. Contact: Conference Director, A/E/C Systems '86, P.O. Box 11318, Newington, Conn. 06111.

JUNE 24-26, CHICAGO — Structured Techniques Association III/Structured Techniques in the Eighties: Practice and Prospects. Contact: Heller Financial Corp., 105 W. Adams St., Chicago, Ill. 60603.

JUNE 24-27, CHICAGO — Autocad Expo '86. Contact: William Ryan, Autocad Expo '86, Autodesk, Inc., 2320 Marlinship Way, Sausalito, Calif. 94965.

JUNE 25, CHICAGO — International Facility Management Association's Computer Applications for Facility Management. Contact: IFMA, Suite 1410, 11 Greenway Plaza, Houston, Texas 77046.

JUNE 25-26, COATESVILLE, PA. — Chester County Expo '86: CAD/CAM Conference from Micro to Mini. Contact: Lee Smith, Central Chester County Vocational Technical School, 1635 E. Lincoln Highway, Coatesville, Pa. 19320.

WEEK OF JUNE 29

JULY 2-3, LAS VEGAS — Full Meeting of the Design Automation Standards Subcommittee. Contact: Ron Waxman, Design Automation Standards Subcommittee Co-Chairman, IBM FSD, 9500 Godwin Drive, Manassas, Va. 22110.

WEEK OF JULY 6

JULY 9-11, NEW YORK — The Fourth Annual PC Expo. Contact: PC Expo, P.O. Box 1026, Englewood Cliffs, N.J. 07632.

WEEK OF JULY 13

JULY 13-18, CHICAGO — Guide 65. Contact: Guide International Corp., 111 E. Wacker Drive, Chicago, Ill. 60601.

WEEK OF JULY 20

JULY 23-25, BOSTON — Microtrends '86, Education: Redirecting the Revolution. Contact: Bobbi Hunt, International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

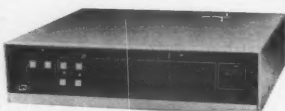
LOCAL DATA

MAP TO

IBM CONNECTIVITY

It's Easy to Solve IBM Connectivity Problems With Local Data Protocol Converters

EASY IBM HOST ACCESS



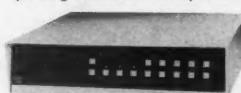
Get immediate host access from an async PC, CRT or printer with DataLynx/3274 or 5251. Use it instead of a cluster controller for economical, secure local and remote connectivity.

A Fresno (CA) hospital uses DataLynx to bring nine DEC VT-100 terminals on line with a BSC host 200 miles away at Blue Cross offices in Los Angeles.

The hospital transfers confidential patient and medicare data to Blue Cross using inexpensive async modems. Administrative productivity is increased through better patient account control and cash flow problems are solved with faster insurance compensation payments.

3287
SPOKEN HERE

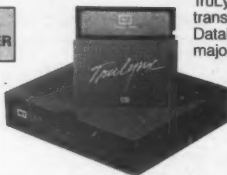
InterLynx/3287 attaches virtually any low cost ASCII printer anywhere you can plug in a 3287, allowing a major department store to access their IBM 4381 with a Texas Instruments 850. This provides an efficient and inexpensive method of printing bridal registry service announcements. The credit department also uses the T1850 for efficient printing of records and reports.



Convert your 3270 coax devices to RS-232 today.

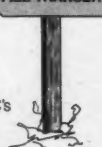
Then place your coax terminals anywhere your PABX, data switch or LAN wiring goes. Mix or match Async and Coax terminals in the network. Sound great? It is.

3270 COAX RECYCLING CENTER



TruLynx PC software provides fast easy file transfer to IBM host programs through DataLynx Protocol Converters. In one major application company executives update financial planning databases from PCs at home and in the office. In another application source code for large mainframe application programs is transferred to and from PCs for demonstration, test and editing.

SPEEDY PC FILE TRANSFER



ROUTE 3X

Local Data offers two excellent System 34, 36, 38 connectivity products. DataLynx/5251 provides exceptional dialup async access with X.25 and ETU file transfer support.

InterLynx/5251 connects to the host at the twinx port, eliminating the costly communications adapter.

Users access the host by way of asynchronous modems or local RS-232C connections.

InterLynx/5251 moves data at 38.4Kb and supports print rates to 5200 cps. DataLynx/5251 recognizes up to 32 LUs, dual sync hosts and supports data at 19.2Kb and 9600 baud.

Customers of a restaurant supply house in Denver dial an IBM/36 host through a DataLynx/5251, check inventory levels, current pricing and perform their own order entry.

This is especially helpful to ski area concession operators who prepare large quantity orders during off hours, cutting delivery time to their mountain locations.

The supplier gives better service, maintains improved inventory and passes savings on to his customers. The customer has better inventory control, schedules deliveries to suit his needs, and maintains easy communications with his supplier.

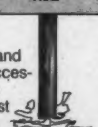
TRAVELER'S AID



Now! Convert any Async minicomputer or PC into a dependable remote job entry station with DataLynx/3780.

One customer in Hawaii using Prime and Micro-data computers for account receivable and payroll data entry, accesses a payroll/service bureau IBM 4300 host with DataLynx/3780.

LOW COST RJE



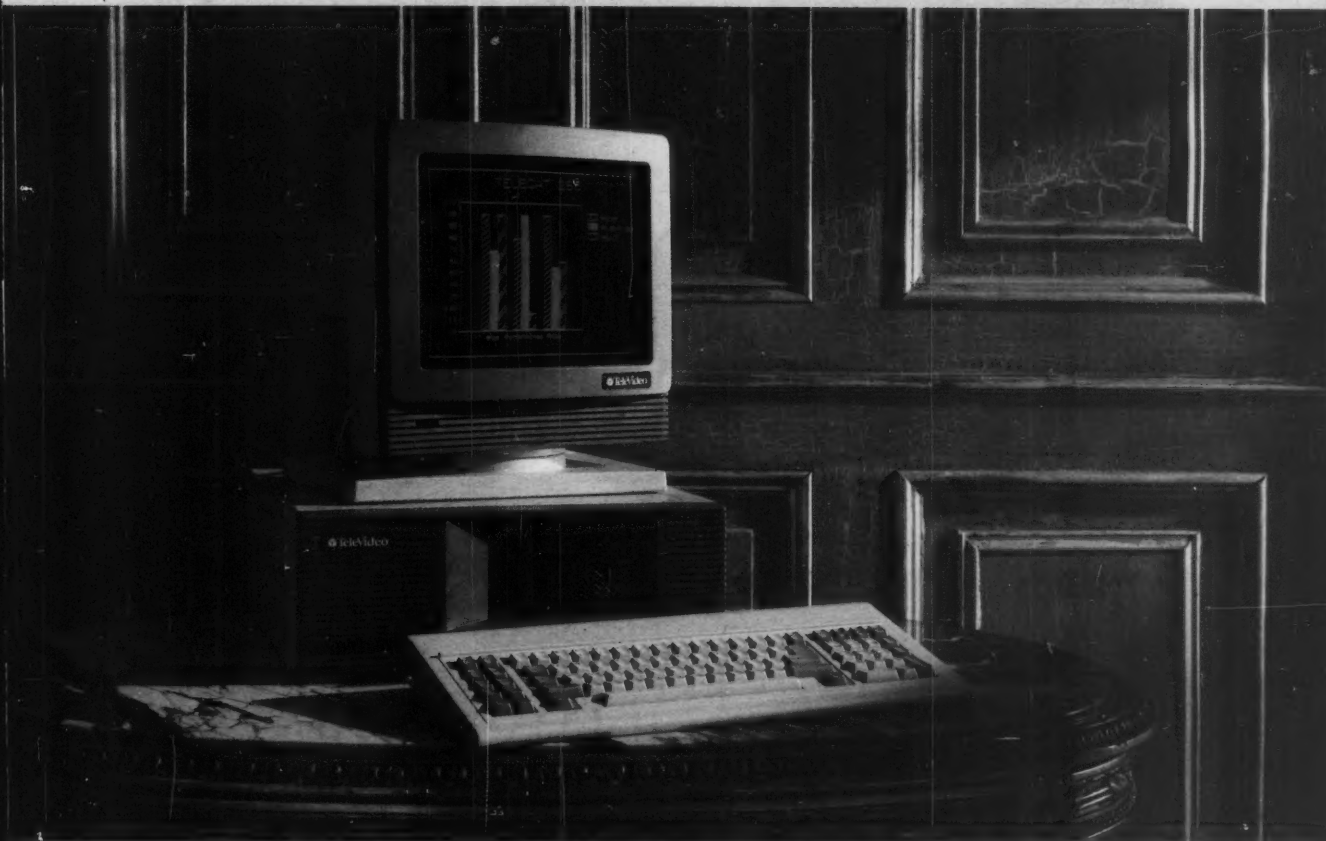
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8771 TOLEDO STREET, TORANCE, CA 90503 TEL 800-855-8555

Get the full connectivity story. Call 213/320-7126. Canada 613/748-9751. UK (0753) 76537.

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It starts you off with everything you need. Including IBM AT compatibility. A 20MB hard disk. A 1.2MB floppy. An Intel 80286 CPU that runs at either 6 or 8 MHz. Even a high-resolution 640x400 pixel monitor for text and graphics. Standard.

To make even better use of internal space, we socketed the TeleCAT-286 for one MB of RAM, and also included serial and parallel ports on the motherboard. As a result, we can still give you three extra expansion slots.

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than the IBM AT's. So you get more of your desk back, too.

There's a lot more we could say about the TeleCAT-286. But it's an even better idea to get your hands on it. So call 1 (800) TELECAT, Dept. 132, and we'll tell you where you can try one.

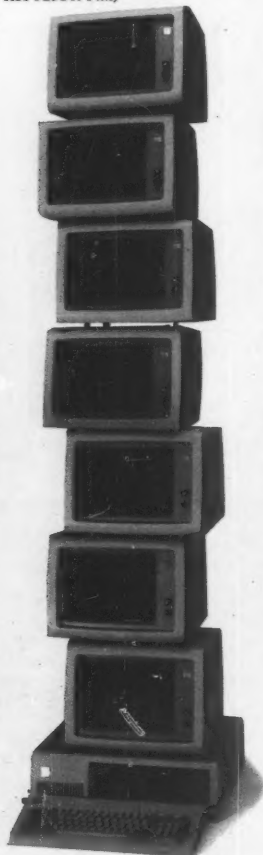
The TeleCAT-286. Our 20MB version is \$2995; 30MB, \$3495. For high performance at a low price, don't settle for less.

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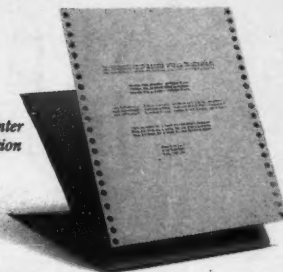
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Multiple Host Sessions—Up To 7 Combinations of Displays and Printers—Simultaneously (Available Only On AST-5251/11 Plus)

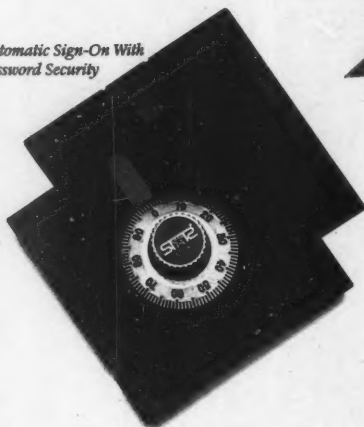


Multiple Printer Sessions, Including 5256, 5224 and 5225 Emulation On PC-attached Printer

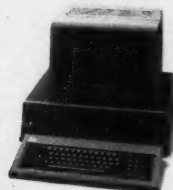
Programmable Printer Format Configuration



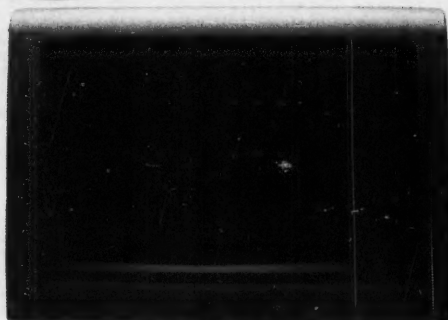
Automatic Sign-On With Password Security



Bidirectional File Transfer



Display Attribute Configuration



**Now! Compatible With
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Build Your Smart Office The Smart Connection™ For

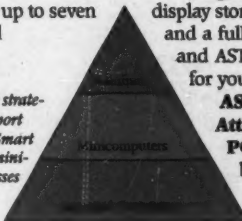
Loaded with the sophisticated features you need, we've just made our original AST-5251/11 even easier to use and more efficient for increased user productivity, and introduced an enhanced version too—AST-5251/11 Plus.™ Now you have lots of new reasons to make AST "The Smart Connection" for your evolving smart office.

Office Smarts—We've Got Them. At AST we've been building solutions for IBM® PC connectivity—the foundations of smart offices everywhere—long before it was a popular concept. You might say, with the over one million AST PC enhancements installed, over 20,000 PC to System 34/36/38 connections and the thousands and thousands of PC to IBM mainframe and local area

network gateway connections we've established worldwide, that we've already made a substantial commitment to helping people realize their fundamental visions of the "smart office."

AST-5251/11—The Direct PC To 34/36/38 Connection. Standard twinax cable, just like IBM's, makes this connection the most convenient for you. Our Hot-Key support provides a toggle between PC DOS and two host sessions. And our new enhanced version, AST-5251/11 Plus, even allows up to seven System 34/36/38 sessions—all concurrently.

AST's family of smart connections are strategically focused and developed to support and evolve in concert with the IBM Smart Office architecture. Highlighting the mini-computer group here, AST also addresses connectivity in mainframe and personal workstation environments.

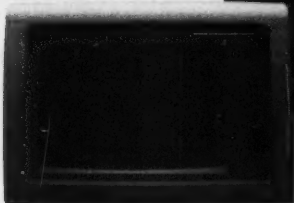


Our file transfer system means you can move host data to and from your favorite PC application software files, like Lotus 1-2-3®, WordStar® and dBASE.™ For easy integration of PC and host applications, we've included our Applications Program Interface (API).

Add all our features illustrated above—everything from bidirectional file transfer to automatic 34/36/38 sign-on with password security, multiple printer support including 5256, 5224 and 5225, snapshot display storage, keyboard mapping help, and a full line of companion products—and AST-5251/11 really spells smart for you.

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Products For Full Model 11
Display Attributes And PC
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20,000

Even More Features

AST-5251/11 Plus or AST-5251/11
Plugs into PC XT/AT and com-
patible; connects to System
34/36/38 via twinax cable and
supports cable thru
• Emulates 5251-11, 5291 or 5292-1
display terminal
• Upgrade Kit for AST-5251/11
to AST-5251/11 Plus
• Selectable DMA and IO inter-
rupt channels
• Applications Program Interface
(API) included
• Supports fixed or hard disk
• Hot-Key assist for concurrent
PC and multiple host sessions
• IBM FSU compatibility (for
virtual disk support on the System
34/36/38)
• Third Party Software support,
including ASTLink by Fusion,
Laguna Laboratories' Decision-
Link™ and The BGS™ by TenMan
Systems
• Complete package includes
hardware, software, twinax cable
assembly & user manuals
AST-5250/Display
• Used with AST-5251/11 brings
full IBM 5251 Model 11 character
and text display attributes to
your IBM monochrome display
• Provides standard IBM PC &

IBM 5251/11 monochrome display
capabilities & a parallel printer port
• Hercules compatible bit-mapped
bit-mapped graphics interface
• Automatically switches from
5251/11 display to PC display mode
without operator intervention
AST-5250/Display-C
• Used with AST-5251/11 brings
IBM 5292 Model 1 display attri-
butes to your PC's color display
• Provides compatibility with IBM
PC Color Graphics Adapter with
full-spectrum color capabilities
• Includes parallel port
• Automatically switches from
5292 Model 1 display to PC display
mode without operator intervention
AST-5251/12
• A total solution for remote
PC/XT/AT/Portable or compatible
to System 34/36/38 communica-
tions in SNA environments
• PC emulates the IBM 5.25
Model 12 terminal
• Host-addressable 5256 printer
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(API) allows integration between
host and PC applications
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documentation

On AST-5251/11: Your PC to System 34/36/38

monochrome display look just like an IBM
Model 11 display.

And it gives you high-resolution Hercules™
compatible bit-mapped graphics, high
quality text and a parallel port.

Now PC 5251/11 emulation is even easier
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screen identical to IBM's. And you can take
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**AST-5250/Display-C™—IBM 5292 Color
Attributes and Standard IBM PC Color
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COMPUTER INDUSTRY

Section begins on page 146

Two business styles grow out of Mohawk Data Sciences

MDS Qantel nemesis becomes firm's defender

By Clinton Wilder

HAYWARD, Calif. — When Asher B. Edelman wanted to shake the bad apples out of Mohawk Data Sciences Corp.'s MDS Qantel computer unit in early 1985, he turned to flamboyant "antivendor" attorney Thomas K. Christo to fill a seat on the MDS board. Two weeks ago, after MDS finally sold the bulk of its U.S. operations for much-needed cash, MDS Qantel raised quite a few eyebrows by naming Christo president and chief operating officer of the minicomputer firm.

Christo gained fame in the 1970s and 1980s representing users and distributors in multimillion-dollar lawsuits against several vendors, including IBM, Hewlett-Packard Co. — and Qantel. But after the Edelman takeover and the recent sale of five MDS divisions, the MDS Qantel that Christo now heads bears little resemblance to the one he faced in the courtroom.

"I always felt it would be a heck of a company if you changed the way it did business," Christo said. "In the past, I was always criticizing. Now I

have an opportunity to be constructive instead of destructive."

In the past year, MDS Qantel has completely eliminated direct sales to the end user, focusing entirely on the value-added distributor channel. Under Christo and Chairman and Chief Executive Officer Matthew E. Tutino, the firm also gutted several layers of top management.



Thomas Christo

"We had to tear down before we could build up," Christo said, "and we had to survive. Only one vice-president that was here a year ago is still here. It was a minor miracle that the company survived."

By selling all of its businesses except Qantel (see story at right) in trademark Edelman style, MDS reduced some \$140 million in debt to \$40 million and removed itself from default on its bank loans. Although it remains to be seen whether MDS Qantel can advance from financial viability to sustained profitability, Christo predicts that the firm will be in the black when its first fiscal quarter ends July 31.

Competing in the mid-range minicomputer area staked out by IBM's System/36 and 38, MDS Qantel will rely on a revamped product line and the sales skills of its value-added dis-

See MDS page 116

Venture capital firms pick up Momentum

By Alan Alper

NEW YORK — It was not long ago that computer industry pundits were taking wagers on the demise of Mohawk Data Sciences Corp. But after a stormy few years resulting in huge debts, Mohawk was recently reincarnated as Momentum Technologies, Inc. under the ownership of two New York venture capital firms.

In the last two years, Parsippany, N.J.-based Mohawk Data Sciences had lost its technological edge and was swaying under the heavy weight of \$234.2 million in combined 1984 and 1985 losses. Arbitrageur Asher Edelman, who took control of the company in 1984 vowing a piecemeal divestiture similar to what he had done at Management Assistance, Inc., was having trouble selling any part of the beleaguered firm. Unlike Management Assistance, the sum of Mohawk's parts did not appear to be greater than the whole.

On the sidelines, seeking a service-oriented computer company, were venture capitalists Donald Ackerman, a general partner at J. H. Whitney & Co., and Bruce Anderson of Welsh, Carson, Anderson & Stowe. Mohawk, despite its losses, seemed

ripe for a leveraged buy-out.

Negotiating first with Mohawk's lenders and then its board of directors, the two venture capital firms struck a deal that would enable them to purchase a majority of Mohawk's assets — excluding MDS Qantel, Inc. (see related story) — as well as buy time to breathe life into its moribund operations. Mohawk's banks gave the new owners a three-year respite on the principal payment of the \$81 million borrowed to acquire five Mohawk business units: MDS Service, MDS Systems, MDS Credit, MDS Storms and MDS Herkimer (CW, May 12).

"We are taking over a business that is immediately profitable and cash-flow positive," Ackerman said in a recent interview. "The service business was the most profitable part of the business; it was Qantel that experienced declining revenues and was not profitable."

The new owners have restructured the five MDS business units, which last year generated revenues of \$160 million, into four Momentum subsidiaries. The only remaining unit owned by Mohawk, MDS Qantel, retains a 10% interest and a seat on the new firm's board. Also, it will receive technical support fees for the maintenance of its installed base.

Momentum will focus mainly on See VENTURE page 116

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Starting this issue, see page 125.

COMPUTERWORLD

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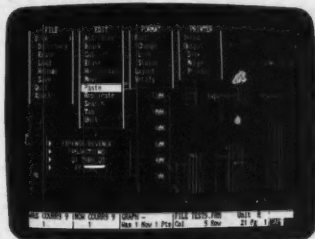
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COMPUTER INDUSTRY

MDS Qantel nemesis

From page 114

tributor network. MDS Qantel has several vertical software packages, with more on the way, after employing what Christo called "SWAT teams to clean up the software" in the past year.

Although Christo downplayed the irony of serving the company that he once served only with lawsuits, some of MDS Qantel's recent changes strongly reflect his litigation legacy. He successfully represented several distributors against the company and made significant changes in the structure of Qantel's relationship with its resellers.

"We have no quotas anymore," he said. "We have milestones for the value-added distributors to earn a larger discount, but it's not Armageddon if they don't make it. And we have no exclusives, so the onus is on us to come up with the best solution for the value-added distributors to resell. The whole world is open to them."

Perhaps most significantly, Qantel has attempted to minimize the effect of its recent turmoil on its small business user base, particularly in maintenance. Under a 10-year royalty agreement, Qantel users will continue to be serviced by the former MDS Service division, now a unit of Momentum Technologies, Inc.

"Amazingly enough, the changes haven't affected us," said Jeff Croft, DP manager of Bauer Enterprises, Inc., a retail lumber and home hardware business in Stow, Ohio.

Christo admits that the small business minicomputer competition is "scary" but is ready to take on competitors the same way he tried to take on the whole industry. "There are a lot of choices out there for the customer, but you can look at it as exciting, too," said Christo, who still maintains his North Hampton, N.H., law office. "If we guess right, we'll be heroes."

HP announces flat earnings

From page 146

Shipments of the high-end products, code-named Spectrum, are not due until year's end and are not expected to contribute to 1986 revenue.

Earlier this month, however, HP announced it was returning most employees from an unpaid vacation program to full-time work but was implementing a hiring freeze at the company.

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Venture firms get Momentum

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systems maintenance, systems integration and reselling, contract manufacturing and lease financing. Hardware design and development, which Ackerman says caused Mohawk's downfall, will be limited to IBM 3270-compatible peripherals.

The key to the firm's success will be its ability to broaden its service business beyond Mohawk's installed base into the third-party arena.

Momentum inherits one of the industry's largest service organizations, with \$70 million in annual revenue, 135 locations nationwide and an 800-member work force.

Ackerman said Momentum will focus greater attention on servicing computer networks and mixed vendor environments.

Three of the four subsidiaries are

"

Momentum inherits one of the industry's largest service organizations, with \$70 million in annual revenue.

being run by managers who remained during the transition from Mohawk to Momentum, and approximately 40 employees currently have equity

holdings in Momentum.

"It's important that people behave and think like owners of the company and share in the success they create," Ackerman said.

In addition, most of Mohawk's 1,700 employees have stayed on with the new venture. "The people are the most important asset we acquired," Ackerman said. "They understand the operation and have knowledge about the accounts. They kept the company going under the most trying of times."

Business and economic conditions permitting, Ackerman said Momentum can grow at roughly 20% annually. Without offering a timetable for such growth, Ackerman said it "can be achieved through internal growth. It can be achieved more quickly, however, with some judicious acquisitions."

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Monday, June 9, 1986

9:00 am - 5:00 pm
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T-1 Fundamentals of Network Control
Gabriel Kasparek, President, Kazcom, Inc.
The basics of network control, including problem diagnosis and repair, maintenance and operational issues.

T-2 Integrated Voice/Data Corporate Networks
Roshan Lal Sharma, Sr. Scientist/Consultant, Telecommunications Network Science.

Network topologies and their synthesis, cost-effective network planning, future trends in intelligent networks and their impact on network management and control.

T-3 Cost Efficient Methods for Implementing New Tariffs
Cheryl A. Cushing, Manager, Reference Services, Connections Telecommunications, Inc.

Post-divestiture tariff rules, including LATAs and POPs with a comparison of major common-carrier tariffs, and evaluation of intra-LATA access alternatives and a review of new regulatory alternatives to traditional network costs.

T-4 ISDN I
Samuel Lynch, Senior Consultant, Zatyko Associates.
Definition and concepts, application standards and world-wide status, plus comparison of ISDN against OSI Reference Model as standard.

T-5 System Network Architecture I
Thomas Routt, Senior Consultant, Zatyko Associates.
Current status of IBM's communication architecture, new extensions such as LU 6.2/APPC and NETBIOS and IBM LANs as "defacto" standards.

COMPUTER INDUSTRY



MERGERS AND ACQUISITIONS

Hammer Technologies, Inc. reported that its subsidiary, **Hammer Computer Systems, Inc.**, has acquired all of the issued and outstanding stock of **Certified Software Systems, Inc.**, a Portland, Ore.-based software company. Certified, a developer of single and multiuser horizontal and vertical software, will be operated as a wholly owned subsidiary of Hammer Computer Systems.

GSD Systems, Inc. has signed a letter of intent to sell 100% of its outstanding stock to **Perle Systems, Ltd.**, a Toronto-based manufacturer

of data communications equipment. GSD Systems is a distributor of protocol converters, data communications equipment and other products for the IBM System/34, 36 and 38.

SHL Systemhouse, Inc. announced it has completed the purchase of all outstanding shares of **Capital Systems, Inc.** of Alexandria, Va., in exchange for 360,000 shares. Capital Systems becomes a unit of **Systemhouse, Inc.** of Arlington, Va., the U.S. subsidiary of SHL Systemhouse, Inc.

Micro-Integration, Inc. and **IE Systems, Inc.**, both privately held, have jointly formed **Micro-Integration Corp.** Micro-Integration is one of the industry's first microcomputer communications software companies.

Charlton Associates of Irvine, Calif., has announced a merger with **Xidex Corp.** of Santa Clara, Calif.

Charlton will become a wholly owned subsidiary of Xidex. Richard Charlton, chairman and chief executive officer of the current company, will head the newly created subsidiary.

It is planned that the subsidiary will incorporate Charlton Associates' current rigid media operations, Xidex's Dysan small disk division and Xidex's newly acquired trimedia sputtered thin-film operation.

Travelers/Diebold Technology Co. announced that it has completed the acquisition of **Execom Systems Corp.**, a decision support systems software company, from **Continental Telecom, Inc.** of Atlanta.

Amdahl, NAS at crossroads

From page 146

the battle, as Storage Technology Corp. found out after becoming the first PCM vendor to reach the billion-dollar level in 1982. The following year, Storage Technology's revenue was down to \$887 million, and in October 1984 the company filed for bankruptcy. After trimming itself down to a \$673 million level in 1985, the premier peripheral PCK vendor is now operating under the theme "back on the road again."

Becoming a \$1 billion company, therefore, requires a whole different mind-set, a new level of management skill and maturity. Unlike Storage Technology, a company that expanded too fast in too many directions, Amdahl has a realistic chance of achieving solid revenue growth in the next two years. By the end of 1988, the first PCM vendor may well be twice the size it was in 1985.

Amdahl enters 1986, the year in which it will start shipping the new 5890-300 dual processor, determined not to repeat the mistakes it made when the 580s were first introduced about four years ago. "We'll be a lot more cautious with the 5890 than with the 5860," says Dick Witcomb, Amdahl's director of financial and public relations. The company plans to ship a few machines in the second

Computer Industry section begins on page 146.

quarter, then pause to evaluate its field performance. If all goes well, volume shipments will commence in late 1986.

Overall, 1986 is likely to be a year of modest financial accomplishments for Amdahl, with up to a 16% growth in revenue and a small increase in earnings. 1986 will be, however, a year of great strategic importance to the company. For during the current 12 months, Amdahl must lay the foundation for the rapid growth that it expects in 1987.

NAS President Dave Martin says, "I've never been more bullish" about his outlook for 1986 and beyond. "We'll beat our most optimistic schedule," he says.

Martin is alluding to the first customer shipment date of NAS' top-of-the-line XL mainframes. The company has already met its schedule with regard to its new double-capacity 7380 disks. NAS started shipping them in March, only eight months after the first customer shipment of IBM's 3380-E models.

NAS' long-term CPU plan is also bullish. During calendar year 1986, however, NAS can be expected to ship only about 40 to 50 of the new XL uniprocessors (100 to 110 in the fiscal year 1987).

Considering the performance advantages the XLs offer compared with the IBM 3090 Model 200s and the Amdahl 5890-300s, the above numbers suggest that NAS will be production constrained. Therefore, the effort needed to persuade NAS' Japanese partner Hitachi Ltd. to increase the output of its Kanagawa, Japan, CPU plant will be an internal marketing challenge that NAS will face in 1986.

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T-6 Public/Private Data Network I

Daniel Zatyko, President, Zatyko Associates.
Current status of IBM's communication architecture, including applications and standards, and development of X.25 up to 1988 CCITT adoption.

T-7 MAP/TOP Systems Interconnection I

Donald Harring, Vice President, Zatyko Associates.
Status of seven layer OSI Reference Model as framework for future network compatibility, review of major vendor architecture - IBM, DEC, etc. migration to manufacturing automation and office communication protocols.

Tuesday, June 10, 1986

9:00 am - 5:00 pm
Select One

T-8 Planning the Network Control Center

Gabriel Kasparek, President, Kazcom, Inc.
User considerations in the design, equipment selection, software, and instrumentation of a network control center and related vendor issues.

T-9 Problem Resolution and Network Management in SNA Networks

Fred Cook, Senior Consultant, Kaptronix.
Techniques useful in analyzing problems in SNA networks. Topics include detailed SNA sequences, VTAM trace, NCCF, NPDA, NLDM and a review of critical parameters in NCP System Generation.

T-10 Network Modeling/Design Workshop

Larry Rhue, Vice President, Connections Telecommunications Inc.
Network design calculations using MNDS PC-based design software and the complimentary Borland SIDEKICK package. Also included, queuing calculations in simple and complex network models, reflecting SDLC, BSC and X.25 protocols, statistical multiplexers and distributed concentrator networks.

T-11 ISDN II

Samuel Lynch, Senior Consultant, Zatyko Associates.
Technology and system/network/switching of ISDN, and certification and network testing, including 1986/87 field trials/user implementation.

T-12 System Network Architecture II

Thomas Routt, Senior Consultant, Zatyko Associates.
Technology and systems impact of SNA and relation to open architectures and protocols on networks from DEC and other vendors, and higher layer SNA services - DIA/DCA, PU 2.1, etc.

T-13 Public/Private Data Network II

Daniel Zatyko, President, Zatyko Associates.
Technology and systems impact of long distance, regional and in-house data networks, including message handling systems and office document interchange formats under different operating systems.

T-14 MAP/TOP Systems Interconnection II

Donald Harring, Vice President, Zatyko Associates.
Session will cover MAP/TOP common protocol connectivity, GM and Boeing programs, other vendor demos, user experiences and the implications of Corporation for Open Systems on MAP/TOP, vendor standards and products.

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COMPUTER INDUSTRY

Ashton-Tate revenue up

TORRANCE, Calif. — Ashton-Tate continued its record growth pattern, reporting a 72% revenue increase for the first quarter ended April 30.

Revenue at the second largest independent microcomputer software company was \$41.7 million, up from sales of \$23.9 million for the same period last year. The revenue increase includes an estimated \$7 million in sales from Multimate International Corp., which was acquired by Ashton-Tate in December.

First-quarter income increased 118% to \$5.1 million, or 47 cents per share, compared with \$2.3 million, or 25 cents, for the first quarter a year ago.

Ashton-Tate President Edward

Esber attributed the rapid revenue growth to high demand for its Dbase III Plus data base management system and increased sales of the Multimate product line.

Ashton-Tate completed the acquisition of Multimate, consolidating operations in sales and product management in its Torrance offices, while maintaining development, technical support and limited Multimate marketing activity in Multimate's East Hartford, Conn., headquarters.

During the quarter, Ashton-Tate raised \$47.7 million in a public offering of about 1.49 million shares of stock.

— Maura McEnaney

Creditors dispute value of STC

From page 146

not filed properly.

But the disagreement over the company's worth will not stop STC from meeting its self-imposed deadline for emerging from bankruptcy, according to observers. "STC has every reason in the world to get out of Chapter 11 as quickly as it can," said James Porter, publisher of "Disk/Trend News," a storage industry newsletter. "They need to rebuild the confidence level of their customers. After all, it's tough for a DP manager to buy from a bankrupt company."

It is also in the best interest of the creditors, many of whom have been

financially squeezed by frozen assets, to get STC out of Chapter 11 as soon as possible, Porter said.

In one of the largest bankruptcies ever to hit the computer industry, STC filed for protection from its creditors on Oct. 31, 1984. Until that time, the company was a leader in the mainframe disk drive and peripherals market, recording sales of \$1.1 billion in 1982. But under the direction of cofounder Jesse Aweida, STC sank millions into assorted development projects just as IBM began to take control of the storage market. By 1984, STC revenue had tumbled to \$808.5 million, and losses had climbed to \$505 million.

Poppa joined STC in January 1985. A seasoned veteran who has been at the helm of several other troubled companies, including Pertec Computer Corp., BMC Industries, Inc. and Mohawk Data Sciences Corp., Poppa first sold STC's \$30 million semiconductor facility to California Devices, Inc. for \$6 million. Not long after that, the company abandoned a multiyear \$140 million optical disk storage project.

"The problem at STC was pure management," Poppa said. "And it wasn't bad management necessarily, just overambitious management. Had they stayed to the base business,

**Computer Industry section
begins on page 146.**

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there never would have been any trouble at STC."

In the year since he joined STC as chairman, Poppa has pared STC to the bare bones. To build cash reserves, he closed or sold all but STC's core tape drive, disk drive and printer operations. In February, STC reported its first profitable quarter since 1983. It is this back-to-basics attitude, combined with the planned debut of a new cartridge tape drive, that has Poppa sure of STC's worth.

The cartridge tape drive with library capabilities, code-named Cimarron, is expected in October. With decreased inventories and regained customer confidence, STC expects 1986 revenue to hit \$725 million and earnings to reach between \$30 million and \$60 million, Poppa said.

And some analysts are optimistic about STC's viability. "STC could definitely come back and could be competition to IBM in the peripherals area," said Debra Silversmith of Hanifen, Imhoff, Inc. in Denver. "They've done a fairly efficient job of cost cutting, and top management has done a lot to reassure customers," she said.

Although STC has had "dozens" of purchase offers, "no one has been willing to pay what we think the company is worth," Poppa said. "They want to buy distressed merchandise, and we are not distressed."

COMPUTERWORLD



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COMPUTER INDUSTRY

Semiconductor group maintains positive business outlook

Forecasts 16% growth in worldwide chip sales

By Maura McEnaney

SAN JOSE, Calif. — The U.S. semiconductor industry's trade group continues to maintain its positive business outlook, although to a somewhat lesser degree, by forecasting a 16% growth in worldwide semiconductor sales in 1986. The forecast is a revision of a September prediction anticipating an 18% increase in worldwide sales.

The mid-year forecast from World Semiconductor Trade Statistics, Inc. (WSTS) projects worldwide shipments to hit \$25 billion in 1986, climbing above 1985 sales of \$21.5 billion. The 1985 total represented a 17% drop from 1984 levels.

In the U.S., however, semiconductor shipments are expected to increase only 11.5%, from \$8.09 billion in 1985 to about \$9 billion. The revised U.S. predictions fall well below the September forecast of a 25% increase.

Regional sales will vary, the statis-

tics show. In the Western European market, sales of semiconductors will grow 11%, from \$4.5 billion to \$5 billion, while the Japanese market will climb 25%, from \$7.6 billion to \$9.5 billion.

The numbers are somewhat skewed since they do not represent the increasing value of the Japanese yen, according to the Semiconductor Industry Association (SIA), publishers of the WSTS figures. "The real Japanese market will grow about 10% to 15%," says the SIA's Ione Ishii.

According to E. F. Hutton & Co. analyst Edward White, the currency differential makes for a much more modest forecast. "Generally the

WSTS figures have been somewhat on the optimistic side, sometimes aggressively on the optimistic side," White says.

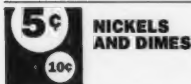
Only recently has the differential had an impact on the sales within the U.S., White notes. "The currency is going to increase U.S. world market share because Japanese company components are looking more expensive as the yen goes up," he claims.

In December, the market research firm Dataquest, Inc. predicted worldwide semiconductor sales would increase 9.8% over last year's totals, according to Dataquest analyst Sheridan Tatsuno. That forecast was later revised to 10% to 12% to address dumping margins after Japanese

firms were hit with steep import duties. But with orders flattening, Dataquest is sticking to its original estimates. "We don't see a real big buildup for the rest of the year," Tatsuno says.

In April, Dataquest predicted a 28% growth in the Japanese market, but because it was listed in U.S. dollars, about 18% of that is owing to currency fluctuation, Tatsuno notes.

The fastest-growing technology in the chip industry this year will be the CMOS category, the SIA indicates. In 1985, sales of CMOS logic chips increased 17% to \$2.6 billion. WSTS estimates that shipments of CMOS chips will increase by 34% this year, 44% in 1987 and 42% in 1988.



Compugraphic Corp. reported net income of \$1.2 million, or 15 cents per share, on revenue of \$86.9 million for the quarter ended March 29. This compares with net income of \$5.5 million, or 66 cents per share, on revenue of \$107.5 million reported the previous year.

LSI Logic Corp. announced revenue for the first quarter ended March 31 of \$45.4 million, up 47% from \$31 million reported one year ago. Profits were \$2.7 million, or 7 cents per share, compared with \$1.5 million, or 4 cents per share, in the like period a year ago.

Priam Corp. reported revenue for the third quarter ended March 31 of \$36.2 million, compared with \$29.2 million one year ago. Profits were \$2.5 million, or 10 cents per share, compared with a net loss of \$4.8 million, or 21 cents per share, in the comparable period a year ago.

Quantum Corp. announced revenue for the year ended March 31 of \$121.2 million, compared with \$120.3 million in the previous year. Profits for the year were \$22.2 million, or \$2.30 per share, compared with \$21 million, or \$2.19 per share, in the like period a year ago.

In the fourth quarter ended March 31, revenue was \$27.7 million, compared with \$33.1 million a year ago. Profits were \$6.9 million, or 71 cents per share, compared with \$6.1 million, or 63 cents per share, in the comparable period a year ago.

Archive Corp. posted revenue for the second quarter ended March 28 of \$20.6 million, compared with \$13.1 million a year ago. Profits for the quarter were \$1.4 million, or 12 cents per share, compared with \$58,000, or 1 cent per share, last year.

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Robin Schwartz is Employment and Employee Relations Manager for McCormack & Dodge, a software company based in Natick, Massachusetts. She is responsible for recruiting people for the company's home office as well as its seven regional offices across the country. And earlier this year when Robin was looking for software applications sales and support people, she chose to run an ad in Computerworld.

"I had numerous openings for positions across the country. From a cost-efficiency standpoint, Computerworld seemed like the logical choice," says Robin. "But before finalizing my decision, I did a little investigating. I talked to our sales managers here at McCormack & Dodge — and they all agreed. The #1 place to recruit qualified computer professionals nationally is Computerworld. To keep in touch with what's going on in the industry, people have to read Computerworld," she explains.

McCormack & Dodge is enjoying national visibility as a result of the ad, but, more importantly, Robin is quite pleased with the responses. *"My people were right. We placed the ad in the beginning of the year and received tremendous response via our two-day hot line (800 number). And since we are still getting resumes, Computerworld obviously has a long life cycle through its pass-along circulation," she adds.*

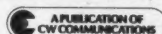
"The quality of the responses has made our ad placement more than worthwhile," concludes Robin. "The professionals responding to our ad are experienced, not just job changers. We are getting in touch with just the people we need to reach." In fact, according to Robin, "Quite a few of the positions are already filled. Thanks to Computerworld!"

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Name: Erik Blom
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Specialties: Ultimate Frisbee, all night cut-throat cribbage, skating in June.

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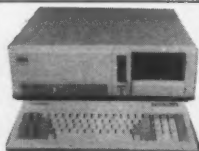
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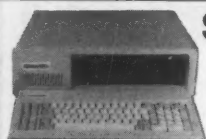
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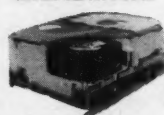
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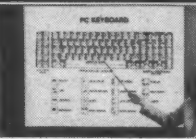
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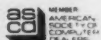
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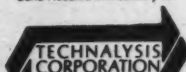
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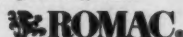
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Electronic Data Processing: analyze data processing requirements for installation and modification of existing systems; install and maintain computer and data communication equipment. Salary \$700 per week, paid holidays and sick leave. Five years experience. Bachelors degree required. Apply Job Service Of Florida, 1350 NW 12th Avenue, Room 280, Miami, Florida. Order # FL-4540253.

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System 38 Senior Programmer Analyst

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COMPUTER INDUSTRY

Honeywell names CEO

Honeywell, Inc. named Vice-Chairman **James J. Renier** to head its day-to-day operations as president and chief operating officer, positions that had been vacant for eight years. Renier, 56, was president of the information systems division from 1982 to 1985. Chairman and Chief Executive Officer Edson Spencer said Renier's appointment "will enable me to focus on Honeywell's long-range opportunities."

■ **Tektronix, Inc.** will reduce its work force by about 10%, cutting 2,000 jobs through "voluntary means" and layoffs if necessary. The Beaverton, Ore., electronic instruments firm will take a one-time charge associated with the cuts in the current quarter ending May 31 and will complete the reductions by Aug. 23. Corporate officers will take 10% salary cuts.

In the first deal of its kind with a foreign vendor, Japan's **Nippon Telegraph and Telephone Corp. (NTT)** signed a \$250 million, five-year contract last week to purchase digitized telephone exchanges from Nashville-based **Northern Telecom, Inc.**, beginning in 1989. Northern Telecom won the procurement deal over AT&T in a bidding battle that dates back to the summer of 1985.

■ The former **Digital Equipment Corp.** employee who allegedly passed trade secrets to **Emulex Corp.** was banned by a federal judge in Colorado from using any of DEC's confidential information. Former DEC engineer **Charles Hess** worked as Emulex's director of engineering for only four days in 1985. DEC's suit against Emulex alleging trade secret misappropriation remains pending in New Hampshire.

Wang buys out Intecom

From page 146

Intecom, pummeled by a successful customer lawsuit and weakened by sagging sales, had looked to many observers as if it might not survive without being acquired by a major company. Intecom's high-end switches in its IBX product line compete with those of Northern Telecom, Inc. and AT&T, but Intecom, with sales of \$120 million last year, could not project the image of long-term market presence that many customers were looking for.

Before the merger, however, Intecom officials last week expressed optimism about the company's future, despite losses of \$7.9 million for the first quarter of 1986 and \$6.6 million for fiscal 1985. They said the company would return to profitability in the third quarter of 1986 through a strategy of selling to large companies that have sizable data transmission needs. But full-year losses are still projected.

The company acknowledged that it will pay \$12.4 million to American Network, Inc. (Amnet), a long-dis-

tant telecommunications firm in Vancouver, Wash., as settlement for the \$37.5 million Amnet recently won in a jury verdict against Intecom. The jury confirmed the plaintiff's claim alleging breach of contract, breach of warranty and fraud, all resulting from the sale of a TSX switch, a device that Intecom no longer offers.

Intecom officials said payment will likely come from Intecom's cash reserves of \$39 million.

In addition to legal difficulties, Intecom has been hurt by a slow market and by competitors that, according to Intecom President and CEO Erik T. Ringkjøb, have been trying to "buy the market" by underpricing their products. "AT&T is bleeding substantially in this segment of the business," Ringkjøb observed.

According to the merger agreement, each of the approximately 26.1 million shares of Intecom common stock not currently owned by Wang is to be converted into shares of Wang Class B common stock. Exxon Corp., which holds 30% of Intecom shares, has agreed to sell all its stock to Wang in exchange for Wang Class B shares.

The boards of directors of both Wang and Intecom have approved the merger.

AT&T appoints Olson chairman

From page 146

turing of the corporate behemoth. "I suspect that under Tobias, Information Systems would be phased out as a separate unit. The writing is on the wall," noted Fritz Ringling of the Gartner Group, Inc.

The unified computer and telecommunications businesses could pave the way for a much-needed reduction of the AT&T work force. Such cutbacks could be accomplished either through attrition or layoffs, but Olson adamantly denied that any cuts are planned: "We don't see any major

downsizing as a result of this."

Analysts, citing ongoing contract negotiations with the Communication Workers of America union, say they believe Olson had no recourse but to discount the possibility of layoffs last week.

Olson becomes the 13th chief executive in AT&T's 101-year history. Brown, who has held the top post for seven years, will reach the mandatory retirement age of 65 in August.

In other management moves, AT&T elevated Executive Vice-Presidents Charles Marshall and Morris Tanenbaum to vice-chairmen of the board. Marshall will continue to direct external affairs and personnel organizations, while Tanenbaum retains authority over financial planning and strategic planning groups.

Altos' 1985 performance brings strong predictions



ACTIVE ISSUES

Kathy Porteus

For a company that pioneered the market for low-end multiuser micros, Altos Computers Systems, Inc. (ALTO — 17%) has relatively few arrows in its back.

One reason is that Altos dodged most of the bad news in 1985 when the market for multiuser systems grew only 3.5%, according to International Data Corp. "While everyone was bleeding horribly, Altos did relatively well," says George Elling, senior vice-president with Oppenheimer & Co. "Altos could really start gaining momentum as the business environment improves."

Analysts agree that the company's prospects look bright for fiscal 1987. And investors, noting Altos' ability to emerge from a difficult year with new product and distribution strategies in place, are currently supporting a \$17 to \$18 price level, up significantly from the \$9 to \$12 range where the stock languished for two years.

Earlier this month, the stock broke through \$19, but soon retreated on news that Phillip White, formerly vice-president of marketing, had left Altos to join Wyse Technology, Inc. as president. White's departure does not signal problems for the company, according to analysts.

Altos now emphasizes larger multiuser systems, such as its 32-bit 3068 and its products based on Intel Corp.'s 80286 chip. Such products have been well received, according to analysts. Don Sinsabaugh, managing director with Swergold, Chefetz & Sinsabaugh, Inc., says he expects Altos to announce during 1987 a product based on Intel's 80386 microprocessor.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

As a result of offering more powerful systems to its target customer base, Altos will eventually face more direct competition from mini-computer vendors such as Data General Corp. and Digital Equipment Corp.

But expanding the product line upwards, says Rich Edwards, analyst with Robertson, Colman & Stephens, "has very positive implications for gross margins and selling expense, because the average system prices are higher." Also, the company's recent technology transfer agreement with Tandem Computers, Inc. involving Altos' 3086 system provides Altos with extra credibility among OEMs and probable future business from Tandem.

Besides its transition to supplying larger multiuser systems, Altos is changing its distribution mix. "What will propel the company's growth during 1987," Sinsabaugh says, "is the number of small OEM contracts Altos signed over the past six months with companies such as TWA and Jeumont-Schneider." According to Oppenheimer's Elling, more OEM deals are brewing.

Until shipments resulting from such OEM agreements begin, analysts expect Altos' quarterly sales to remain flat. Edwards of Robertson, Colman projects "two further quarters of shipments at roughly \$38 million, followed by a marked increase of about \$4 million each quarter, reflecting shipments to new OEM customers."

According to Edwards, Altos will earn 77 cents a share on \$143 million in sales for fiscal 1986, ending June 30th, and \$1 a share on \$174 million in fiscal 1987. Edwards admits his estimates are on the conservative side as a result of uncertainty about the U.S. economy and "how well international orders hold up." Foreign business accounted for 34.7% of company revenue during the third quarter.

More enthusiastic is Elling, who currently recommends purchase of Altos because the stock's "leverage is now on the up side." Elling estimates Altos will earn \$1.10 to \$1.20 a share in fiscal 1987. "If Altos gets OEM orders on-stream," Elling says, "these numbers could be better."

Intelligent Systems lays off 17, fires 3

By James A. Martin

NORCROSS, Ga. — Intelligent Systems Corp.'s Quadram and Intecolor divisions laid off 17 assembly workers and middle management employees because of an anticipated summer slowdown in sales and production.

The layoffs were attributed to continuing sluggishness in the personal computer plug-in accessory boards market. Other staff changes are a result of corporate restructuring under the helm of Robert Brown, who was named Quadram president three months ago. In addition, three product managers were fired for

"poor performance," while the Datacube portable computer division increased its staff by six.

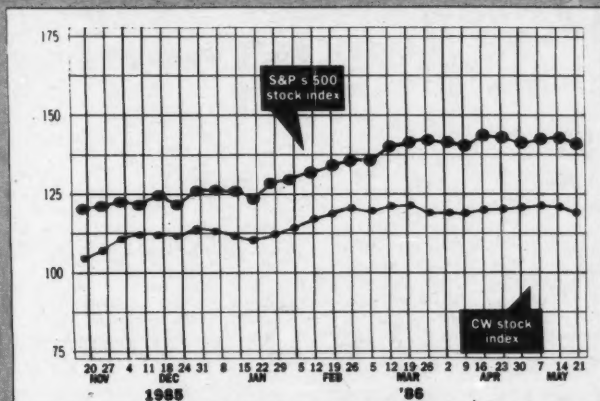
Separately, Intelligent Systems reported net earnings for the fourth quarter ended March 31 of \$1.2 million, or 10 cents a share, compared with a loss of \$7.2 million, or 64 cents a share, the previous year. Revenue for the quarter increased 9%, to \$35.1 million from \$32.2 million.

The firm had net income of \$33,000 for fiscal 1986, ended March 31, compared with \$1.8 million for 1985. Revenue was \$125.5 million for 1986, up from \$123.9 million.

COMPUTER INDUSTRY

MITCHELL J. HAYES

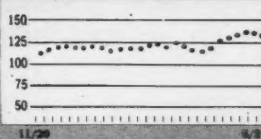
Computerworld stock trading index



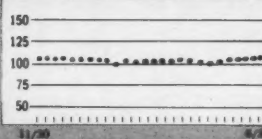
All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	5/14/86	5/21/86
Computer systems	128.9	137.8
Software and DP services	106.4	106.1
Peripherals and subsystems	125.0	128.9
Supplies and accessories	154.6	160.8
Semiconductors	110.6	109.2
Leasing companies	104.8	104.2
CW stock index	121.5	130.0
Standard and Poor's 500 stock index	142.0	140.8

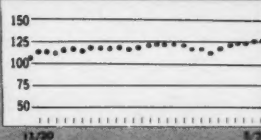
Computer systems



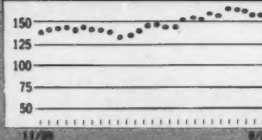
Software and DP services



Peripherals and subsystems



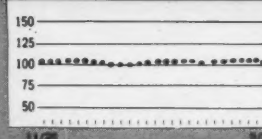
Supplies and accessories



Semiconductors



Leasing companies



Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, MAY 21, 1986

EXCH	SYMBOL	PRICE					EXCH	SYMBOL	PRICE					EXCH	SYMBOL	PRICE				
		52-WEEK RANGE	CLOSE MAY 21 1986	WEEK NET CHG	WEEK PCT CHG				52-WEEK RANGE	CLOSE MAY 21 1986	WEEK NET CHG	WEEK PCT CHG				52-WEEK RANGE	CLOSE MAY 21 1986	WEEK NET CHG	WEEK PCT CHG	
COMPUTER SYSTEMS																				
O	ALPHA MICROSYSTEMS	5-9	6 3/4	-1/2	-6.8	N	ADVANCED COMP TECH	2-6	5 5/8	-1/8	-2.1	P	AM INTERNATIONAL	3-8	8 1/8	-1/8	-1.5			
O	ALDS COMPUTER SYST	9-19	17 1/2	-5/8	-3.4	N	ADVANCED SYSTEMS INC	9-20	17	-1/8	-0.7	A	ANDERSON JACOBSON	2-5	2 1/4	+1/8	+5.8			
A	AMDAH CORP	10-18	14 5/8	-7/8	-5.6	N	AGS COMPUTERS INC	10-25	20 3/4	-1/4	-1.1	O	AST RESEARCH INC	7-33	17	-2 3/8	-12.2			
O	APOLLO COMPUTER	9-31	15 1/4	-1/4	-1.6	O	AMERICAN SOFTWARE	9-15	12	+1/4	+2.1	O	AUTO-TROL TECHNOLOGY	3-13	5	0	0.0			
O	APPLE COMPUTER INC	14-37	37 1/4	+1/4	+0.3	N	ANACOMP INC	2-6	5 5/8	+1/8	+2.2	O	AVANT-GARDE COMPUTING	3-21	4	-3/8	-9.7			
N	AT&T	19-28	24 1/8	-1/4	-1.0	O	ANALYSTS INTL CORP	5-11	7 1/4	-1/2	-6.4	O	BANCTEC INC	6-12	11 1/2	+1/4	+2.2			
N	BURROUGHS CORP	52-71	58 3/4	-1 1/8	-1.8	O	ASHTON TATE	6-30	12 1/2	-1/8	-3.7	O	BEDVIEW INT'L	1-2	1/8	0	0.0			
O	COMPAQ COMPUTER CP	5-18	17 3/8	-1/2	-2.7	O	ASK COMPUTER SYSTEMS	7-25	12 1/8	+5/8	+5.4	N	BOLT, BERANEK & NEW	20-44	44 1/4	+1	+2.3			
O	COMPUTER AUTOMATION	1-9	2 1/8	-1/8	-5.5	B	ASTRADYNE COMP IND	1-3	5/8	-1/8	-6.8	O	CAMTEC CORP	1-3	1 1/2	0	0.0			
O	COMPUTER CONSOLES	5-14	10 5/8	+1/2	+4.9	N	AUTOMATIC DATA PROC	35-71	70	-1/4	-0.3	N	CENTRONICS DATA COMP	3-11	6 1/4	0	0.0			
N	CONTROL DATA CORP	15-39	23 1/2	0	0.0	O	COMPUTER NETWORK	5-9	7 7/8	-1/4	-3.0	A	CETEC CORP	6-9	7 1/2	-3/8	-4.7			
O	CONVERGENT TECHNOL	5-13	9 7/8	+5/8	+6.7	O	COMPUTER ASSOC INT'L	9-23	23	+1 1/4	+5.7	A	COGNITRONICS	4-7	4 1/8	0	0.0			
O	CPT CORP	4-8	1/4	-3/8	-8.1	O	COMPUTER HORIZONS	5-12	13 7/8	+1/2	+3.7	N	COMPUGRAPHIC CORP	23-36	23	0	0.0			
N	CRAY RESEARCH INC	25-87	86 1/2	+4 3/4	+5.8	N	COMPUTER SCIENCES	13-36	34 5/8	-1/2	-1.4	O	COMPUTER TRANSCIVER	0-1	7/8	0	0.0			
O	DAISY SYSTEMS CORP	11-38	12 1/4	-1/4	-2.0	O	COMPUTER TASK GROUP	10-28	24 1/4	-2 1/2	-8.3	N	COMPUTERVISION CORP	9-41	16 5/8	-1/2	-2.8			
N	DATA GENERAL CORP	31-76	40 5/8	+7/8	+2.2	O	COMPUTER USAGE	1-3	0	0.0	0.0	N	COMVAC CORP	12-18	16 3/4	-1/4	-1.4			
N	DATAPoint CORP	5-22	7 3/4	+1/2	+6.8	O	COMPUTONE SYSTEMS	3-11	4 3/8	-1/2	-10.2	A	DATAPRODUCTS CORP	11-20	17 1/2	+5/8	+3.8			
N	DIGITAL EQUIPMENT	42-91	87 1/8	-7/8	-0.9	O	CONSERV CORP	1-6	3 1/4	0	0.0	O	DATA SWITCH CORP	4-17	16 1/2	-1/4	-1.4			
N	ECHO INC	13-17	17 3/8	+3/8	+2.2	O	COMSHARE	7-13	13 1/4	+1/8	+0.9	O	DATA SWITCH CORP	4-9	7 1/2	-3/4	-8.0			
N	ELECTRONIC ASSOC.	3-7	5 3/4	-1/8	-2.1	N	CULLINET SOFTWARE	12-33	15 1/4	+1/8	+0.8	O	DATUM INC	5-9	6 3/4	0	0.0			
N	FLOPPING POINT SYST	18-42	37 7/8	-2	-5.0	O	CYCARD SYSTEMS INC	13-27	16 5/8	+2 3/8	+16.8	O	DECISION DATA COMPUT	10-20	12 1/2	+1/2	+4.1			
N	FOXBORO	22-31	29 1/4	-1/4	-0.8	O	HOGAN SYSTEM INC	4-12	10 3/4	0	0.0	O	ENDATE INC	2-8	6 1/8	0	0.0			
N	GOULD INC	20-38	23 1/8	-3/8	-13.5	N	GENERAL ELECTRIC CO	56-79	76 1/2	-1	-1.2	N	EVANS & SUTHERLAND	12-27	26	-1	-3.7			
N	HARRIS CORP	22-35	31 3/8	-1 1/8	-3.4	N	GENL MOTORS E (EDS)	20-49	48 1/4	-1 1/8	-2.2	O	GANDALF TECHNOLOGIES	5-13	6	0	0.0			
N	HEWLETT-PACKARD CO	29-45	43 1/4	-1	-2.2	N	GTE CORP	36-54	49 1/2	-1	-1.9	N	GEN'L DATA COMM IND	8-21	12 7/8	-1/8	-0.9			
N	HONEYWELL INC	54-87	77 1/2	+3/8	+0.4	O	INFORMATION SCIENCE	1-5	3 3/8	+1/8	+3.8	N	HAZELTINE CORP	17-30	16 1/2	-1/2	-2.9			
N	IBM	117-158	144 1/2	-3 5/8	-2.4	O	INFOTRON SYSTEMS CP	13-24	16 3/4	+1 3/4	+4.7	O	ICOT CORP	3-12	12	+1/8	+1.0			
O	ILI SYSTEMS INC	1-4	1/2	+5/8	+26.3	O	KEANE ASSOCIATES	10-20	14	0	0.0	O	INFORMATION INTL INC	10-17	14 1/2	-1 1/4	-7.9			
N	ITT CORP	28-48	45 1/2	-1	-2.1	N	LOGICON	25-43	36 3/8	+7/8	+2.4	O	INTECOM INC	3-11	4 3/8	-1/8	-2.7			
N	M/A-COM INC	13-24	16 1/8	-1/2	-3.0	O	LOTUS DEVELOPMENT CP	15-37	34 3/4	+1 3/4	+4.7	O	INTEGRA CORP	3-8	3 1/8	-1/8	-4.0			
N	MANAGEMENT ASSIST	2-28	2 3/8	0	0.0	O	MCI COMMUNICATIONS	7-13	10	0	0.0	O	INTEGRATED CORP	7-14	13 5/8	-3/8	-2.6			
N	MATSUSHITA ELEC(ADR)	49-98	87 1/2	-3 5/8	-3.9	O	MGT SCI AMER INC	7-16	14 3/8	+3/8	+2.6	O	INTEGRA CORP	24-52	49	+2 1/4	+4.8			
O	MENTOR GRAPHICS	13-30	16 3/4	-5/8	-3.5	O	MATHEMATICAL APP GRP	1-8	1/2	0	0.0	O	NETWORK SYSTEMS CORP	11-27	13 3/4	-1/4	-3.1			
N	MODULAR COMPUTER SYS	6-9	8 7/8	-1/8	-1.3	O	MICOM SYSTEMS INC	12-36	15	-1	-6.2	N	NO AMERICAN PHILIPS	32-47	40 3/4	-5	-10.9			
N	MONARK DATA SCI	1-13	3 3/8	0	0.0	O	MICROPRO INT'L CP	2-4	2 1/2	0	0.0	O	NORTHERN TELECOM LTD	26-41	29 1/8	-7/8	-2.5			
N	NSI INC	11-20	11	-1/2	-8.3	O	NATIONAL DATA CORP	8-25	22 3/8	-2 1/2	-10.0	O	OMEX	1-3	7 1/2	0	0.0			
N	NCR	25-54	53 3/4	+7/8	+1.6	O	ON-LINE SOFTWARE INT	4-16	13 1/2	-1 3/4	-11.4	N	ORADYNE CORP	6-18	10 3/4	+3/4	+7.5			
N	PERKIN-ELMER	22-36	29 5/8	-3/4	-8.4	N	PARSONS SYSTEMS	14-34	33 1/2	-7/8	-2.5	A	PENRIL CORP	1-3	7 1/2	0	0.0			
N	PRIME COMPUTER INC	15-27	20 1/2	-3/4	-3.5	N	PLANNING RESEARCH	11-23	11 5/8	-8/8	-8.9	O	PLESSEY CO (ADR)	19-38	34 1/2	0	0.0			
N	SPERRY CORP	36-73	72 1/4	-5/8	-0.8	O	POLICY MGMT SYS CP	16-35	19 3/4	-1 3/4	-8.1	O	PRINTRONIX INC	9-18	13 1/2	+1/8	+0.9			
O	STRATUS SYSTEMS INC	9-25	23 1/2	+1 3/4	+5.6	O	PROGRESS MICRO SYS	4-10	6 5/8	-3/8	-6.7	O	QMS INC	6-16	13 3/4	+1/4	+1.8			
O	TANDEN COMPUTERS INC	24-44	39 3/4	-1 1/8	-2.7	O	REYNOLDS & REYNOLD	30-65	31	+1/4	+0.8	O	RAMTEC CORP	2-7	5 1/2	-3/8	-6.3			
N	TANDY CORP	24-44	39 3/4	-1 1/8	-2.7	O	SEI CORP	13-27	24 1/2	-1/2	-2.0	O	RECOGNITION EQUIP	9-27	16 3/8	+2 1/4	+15.9			
O	TELEVIDEO SYSTEMS	3-6	21	0	0.0	O	SHARED MEDICAL SYS	26-38	36 5/8	+1/4	+0.6	N	SANDERS ASSOCIATES	29-44	29 3/8	0	0.0			
O	TELIX CORP	6-21	20 7/8	-1/8	-0.4	O	SCIENTIFIC COMPUTERS	12-22	20 1/4	-1 1/8	-5.2	O	SCAN-TRON CORP	9-12	11	+1/2	+2.7			
N	TEXAS INSTRUMENTS	86-141	136 5/8	+1/8	0.0	O	SOFTWARE AG	12-22	20 1/4	-1 1/8	-5.2	N	SCIENTIFIC ATLANTA	10-15	10 3/8	-5/8	-5.6			
N	ULTIMATE CORP	8-32	30 3/4	+1/4	+0.8	N	URS CORP	18-18	18 7/8	+4.0	+3.3	O	SEAGATE TECHNOLOGY	12-17	12 1/2	-1/4	-1.8			
O	VECTOR GRAPHICS INC	1-1	1/8	0	0.0	N	UCCEL	11-21	20 1/4	-1	-4.7	N	STORAGE TECHNOLOGY	1-5	4 1/4	0	0.0			
A	WANG LABS "B"	15-29	17 1/4	0	0.0	O	VM SOFTWARE	17-29	27 3/4	-1	-3.4	O	SYKES DATATECHNICS	0-2	3/8	0	0.0			
A	WANG LABS "S"	15-29	17 1/4	0	0.0							O	TAB CORP	14-23	21 1/4	+1/2	+2.4			
N	XEROX CORP	37-72	57 3/4	-1 1/2	-2.5							O	TANDON CORP	4-7	5 1/2	0	0.0			
SUPPLIES & ACCESSORIES																				
N	AMERICAN BUS PRODS	21-36	32 3/4	-1/2	-1.5	N	ADVANCED MICRO DEV	22-36	25 3/8	-7/8	-3.3	A	TAB PRODUCTS CO	14-23	21 1/4	+1/2	+2.4			
N	BARRY WRIGHT	19-29	23 1/8	-1/2	-4.3	N	ADV'D SEMICONDUCTOR	7-23	11 1/4	-1	-8.1	O	TANDON CORP	4-7	5 1/2	0	0.0			
A	DUPLEX PRODUCTS INC	13-22	22 1/4	-1/8	-0.5	O	ANALOG DEVICES INC	14-24	23 1/2	-3/4	-3.1	N	TEC INC	6-13	5	0	0.0			
N	ENWIS BUS FORMS	14-28	23 3/4	-3/8	-1.5	N	ANALOGIC CORP	16-16	12 1/2	-1 3/8	-11.4	N	TEKTRONIX INC	47-68	59 3/4	-3/4	-1.2			
N	3M COMPANY	75-107	88 1/2	-1 1/4	-3.6	N	APPLIED MAGNETICS CP	9-19	18 1/2	-3/4	-3.8	N	TELEX	34-68	63 1/8	-5/8	-0.9			
N	MOORE CORP LTD	15-27	23 7/8	-3/8	-3.5	O	HADCO CORP	18-26	18 1/4	-5/8	-3.3	O	TESDATA SYSTEMS CP	0-3	5/8	0	0.0			
O	STANDARD REGISTER	22-33	28 1/2	-2 1/4	-8.7	O	INTEL CORP	21-33	26 1/2	-1 5/8	-5.7	N	TIMEPLEX INC	15-23	18 1/4	+3/8	+2.0			
N	WALLACE COMP SERVICE	30-48	47 3/8	-3/8	-0.7	O	MICRO MASK INC	5-12	5 1/2	-3/8	-6.9	O	SELECTFORM INC	6-12	7 1/4	+1/4	+3.5			
						N	MOTOROLA INC	29-48	46 1/2	-1/4	-0.5	O	U.S. LEASING	32-46	40	-3/4	-1.8			
						N	NAT'L SEMICONDUCTOR	10-15	13 7/8	0	0.0									
						N	TERADYNE	17-33	26	-1/2	-1.8									
PERIPHERALS & DP SERVICES																				
P	AM INTERNATIONAL	3-8	8 1/8	-1/8	-1.5	N	ANDERSON JACOBSON	2-5	2 1/4	+1/8	+5.8	O	AST RESEARCH INC	7-33	17	-2 3/8	-12.2			
A	ANDERSON JACOBSON	2-5	2 1/4	+1/8	+5.8	O	AUTO-TROL TECHNOLOGY	3-13	5	0	0.0	O	AVANT-GARDE COMPUTING	3-21	4	-3/8	-9.7			
O	AST RESEARCH INC	7-33	17	-2 3/8	-12.2	O	BANCTEC INC	6-12	11 1/2	+1/4	+2.2	O	BEDVIEW INT'L	1-2	1/8	0	0.0			
O	AUTO-TROL TECHNOLOGY	3-13	5	0	0.0	N	BOLT, BERANEK & NEW	20-44	44 1/4	+1	+2.3	O	CAMTEC CORP	1-3	1 1/2	0	0.0			
O	AVANT-GARDE COMPUTING	3-21	4	-3/8	-9.7	O	CAMTEC CORP	1-3	1 1/2	0	0.0	N	CENTRONICS DATA COMP	3-11	6 1/4	0	0.0			
O	BANCTEC INC	6-12	11 1/2	+1/4	+2.2	O	CETEC CORP	6-9	7 1/2	-3/8	-4.7	A	COGNITRONICS	4-7	4 1/8	0	0.0			
O	BEDVIEW INT'L	1-2	1/8	0	0.0	N	COMPUGRAPHIC CORP	23-36	23	0	0.0	N	COMPUGRAPHIC CORP	23-36	23	0	0.0			
N	BOLT, BERANEK & NEW	20-44	44 1/4	+1	+2.3	O	COMPUTER ASSOC INT'L	9-23	23	+1 1/4	+5.7	O	COMPUTER TRANSCIVER	0-1	7/8	0	0.0			
O	CAMTEC CORP	1-3	1 1/2	0	0.0	O	COMPUTER HORIZONS	5-12	13 7/8	+1/2	+3.7	N	COMPUTERVISION CORP	9-41	16 5/8	-1/2	-2.8			
N	CENTRONICS DATA COMP	3-11	6 1/4	0	0.0	O	COMPUTER NETWORK	5-9	7 7/8	-1/4	-3.0	N	COMPUTERVISION CORP	9-41	16 5/8	-1/2	-2.8			
A	CETEC CORP	6-9	7 1/2	-3/8	-4.7	O	COMPUTER SCIENCE	13-36	34 5/8	-1/2	-1.4	O	COMPUTER TRANSCIVER	0-1	7/8	0	0.0			
O	COGNITRONICS	4-7	4 1/8	0	0.0	O	COMPUTER TASK GROUP	10-28	24 1/4	-2 1/2	-8.3	N	COMPUTERVISION CORP	9-41	16 5/8	-1/2	-2.8			
O	COMPUGRAPHIC CORP	23-36	23	0	0.0	O	COMPUTER USAGE	1-3	0	0.0	0.0	N	COMVAC CORP	12-18	16 3/4	-1/4	-1.4			
O	COMPUTER ASSOC INT'L	9-23	23	+1 1/4	+5.7	O	COMPUTONE SYSTEMS	3-11	4 3/8	-1/2	-10.2	A	DATAPRODUCTS CORP	11-20	17 1/2	+5/8	+3.8			
O	COMPUTER HORIZONS	5-12	13 7/8	+1/2	+3.7	O	CONSERV CORP	1-6	3 1/4	0	0.0	O	DATA SWITCH CORP	4-17	16 1/2	-1/4	-1.4			
O	COMPUTER NETWORK	5-9	7 7/8	-1/4	-3.0	O	COMSHARE	7-13	13 1/4	+1/8	+0.9	O	DATA SWITCH CORP	4-9	7 1/2	-3/4	-8.0			
O	COMPUTER SCIENCE	13-36	34 5/8	-1/2	-1.4	N	CULLINET SOFTWARE	12-33	15 1/4	+1/8	+0.8	O	DATUM INC	5-9	6 3/4	0	0.0			
O	COMPUTER TASK GROUP	10-28	24 1/4	-2 1/2	-8.3	O	CYCARD SYSTEMS INC	13-27	16 5/8	+2 3/8	+16.8	O	DECISION DATA COMPUT	10-20	12 1/2					

EXCH: N=NEW YORK; A=AMERICAN;

COMPUTER INDUSTRY

INSIDE

Mohawk Data Sciences seeks rebirth in the hands of venture capitalists and a former courtroom nemesis/114

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The U.S. semiconductor industry predicts 16% growth this year after its 17% sales drop in 1985/118

Honeywell names Vice-Chairman James J. Renier president/144

INSTANT ANALYSIS

"Authors of business plans are like would-be novelists. Almost no one will read their work, and the few who do will probably reject it."

— Richard A. Shaffer, editor and publisher, "Technologic Partners Computer Letter"

Wang buys out Intecom

Pays \$156 million for remaining 80% of switch maker

By Stanley Gibson

ALLEN, Texas — After two years of seeking an acquirer, Intecom, Inc. has found the large partner it desired. Last week, Intecom's 20% owner, Wang Laboratories, Inc., announced it will make the vendor of digital private branch exchange equipment a wholly owned subsidiary of Wang in a transaction valued at \$156 million.

In merging, Intecom gives up its independence in exchange for the credibility that comes from being a part of a major international company. Wang, in turn, gains a company with sophisticated switching products that it believes are strategically important. The pattern mirrors the relationship of Rolm Corp. and IBM, whose original 15% equity partnership led to Rolm's complete acquisition by IBM in

1984.

"The migration to twisted-pair wire in computing networks means that computer companies will have to get telecommunications capability. And all information will flow through a switch like ours," said C. Michael Bowen, chairman, chief executive officer and a founder of Intecom. Bowen said he had merger talks with nearly every major computer company as well as with such companies as General Motors Corp.

"Together with the smaller switch technology of Telenova, Inc., in which Wang has a 42% interest and the option to acquire control, Wang now possesses a very broad foundation for the integration of voice and data, which is essential to our industry," An Wang, chairman and CEO of Wang, said in a prepared statement.

See WANG page 144

Creditors dispute STC value

Poppa downplays import of \$300 million discrepancy

By Maura McEnaney

LOUISVILLE, Colo. — A \$300 million disagreement with creditors over the value of Storage Technology Corp. (STC) is standing in the way of an approved reorganization plan for the company to emerge from Chapter 11 of the U.S. Bankruptcy Code, STC's chairman said recently.

Chairman Ryal R. Poppa told analysts at a recent Hambrecht & Quist investment conference in San Francisco that the next few weeks should bring a consensus with the credit committee on how much STC will be worth as of Jan. 1, 1987, when it is expected to come out of bankruptcy.

"We believe the company is valued between \$500 and \$600 million, but the creditors are saying the company is only worth about \$250 million," he said.

Sources familiar with bankruptcy proceedings say valuation discrepancies like this one are the result of both sides attempting to get the most out of their dollar as well as a somewhat arbitrary means of determining a company's worth. When debt is being paid off in stock, creditors seeking the best deal want a company to be valued low in order to receive more shares.

Conversely, when a company is valued at a higher price, fewer shares need to be issued to meet the debt.

STC claims it owes creditors approximately \$700 million. The company's credit committee is now considering a plan that will give creditors \$100 million in cash, \$300 million in eight- to 12-year notes and the balance in equity.

STC recently asked the Federal Bankruptcy Court to invalidate some \$400 million of creditors' claims, including a claim from the European Computer Manufacturers Association. STC alleged that some claims were duplicates and others were

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STC's Poppa

HP announces flat earnings

RISC-based Spectrum could provide infusion

By Maura McEnaney

PALO ALTO, Calif. — Hewlett-Packard Co. produced further evidence of its need for the much-touted Spectrum program last week, announcing flat earnings and revenue for the quarter ended April 30.

Second-quarter revenue was \$1.78 billion, up only slightly from \$1.68 billion a year ago. Earnings declined 2% to \$127 million, or 49 cents per share, compared with \$129 million, or 51 cents per share, during the same period last year.

The revenue increase is due in part to a 12% increase in international or-

ders, the company said. Incoming orders climbed 6% to \$1.7 billion.

Year-to-date revenue at HP was \$3.4 billion, up 5% over 1985 figures. Earnings, however, are down 4% to \$236 million, or 92 cents per share.

The financial figures come as no surprise to HP observers, who have been watching the company's order rate slip for about two years.

In a prepared statement, John A. Young, HP president and chief executive officer, said, "The fact is our U.S. business has been essentially flat for nearly two years. It continues to be a difficult business environment."

In February, HP unveiled its new product line based on reduced instruction set computing architecture.

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AT&T appoints Olson chairman, groups businesses under Tobias

By Alan Alper

NEW YORK — AT&T announced several major organizational changes last week, including the expected promotion of President and Chief Operating Officer James E. Olson to chairman and the grouping of its computer and long-distance businesses under the same executive.

Randall L. Tobias, chairman of AT&T Communications, will also become chairman of AT&T Information Systems effective Sept. 1. He replaces Robert E. Allen, who succeeds Olson as president and chief operating officer and joins the board of directors upon Chairman Charles L. Brown's retirement.

With Tobias presiding over Infor-

mation Systems and Communications, analysts said AT&T will be able to present a more coherent front to end users, many of whom have professed confusion over the firm's strategy.

Olson said AT&T would move to combine certain aspects of Information Systems and Communications so the firm could have one group representing its total array of products. He declined to say how the two groups would be combined, adding that "further steps will be announced as they unfold in the weeks and months ahead."

Some analysts believe Olson's statements presage a total restructuring.

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INDUSTRY INSIGHT
Bob Djurdjevic

Amdahl, NAS at crossroads

At a time when industry headlines echo the woes of some vendors caught in an alleged slump, it is important not to generalize about the extent or the depth of the problem. IBM's single-digit growth may indeed qualify as a slump relative to the company's earlier optimistic forecasts. But Digital Equipment Corp.'s 86% earnings growth in the first quarter of 1986 and positive reports from other large vendors are reminders that the term "slump" may be an unjustified exaggeration of the industry's problems.

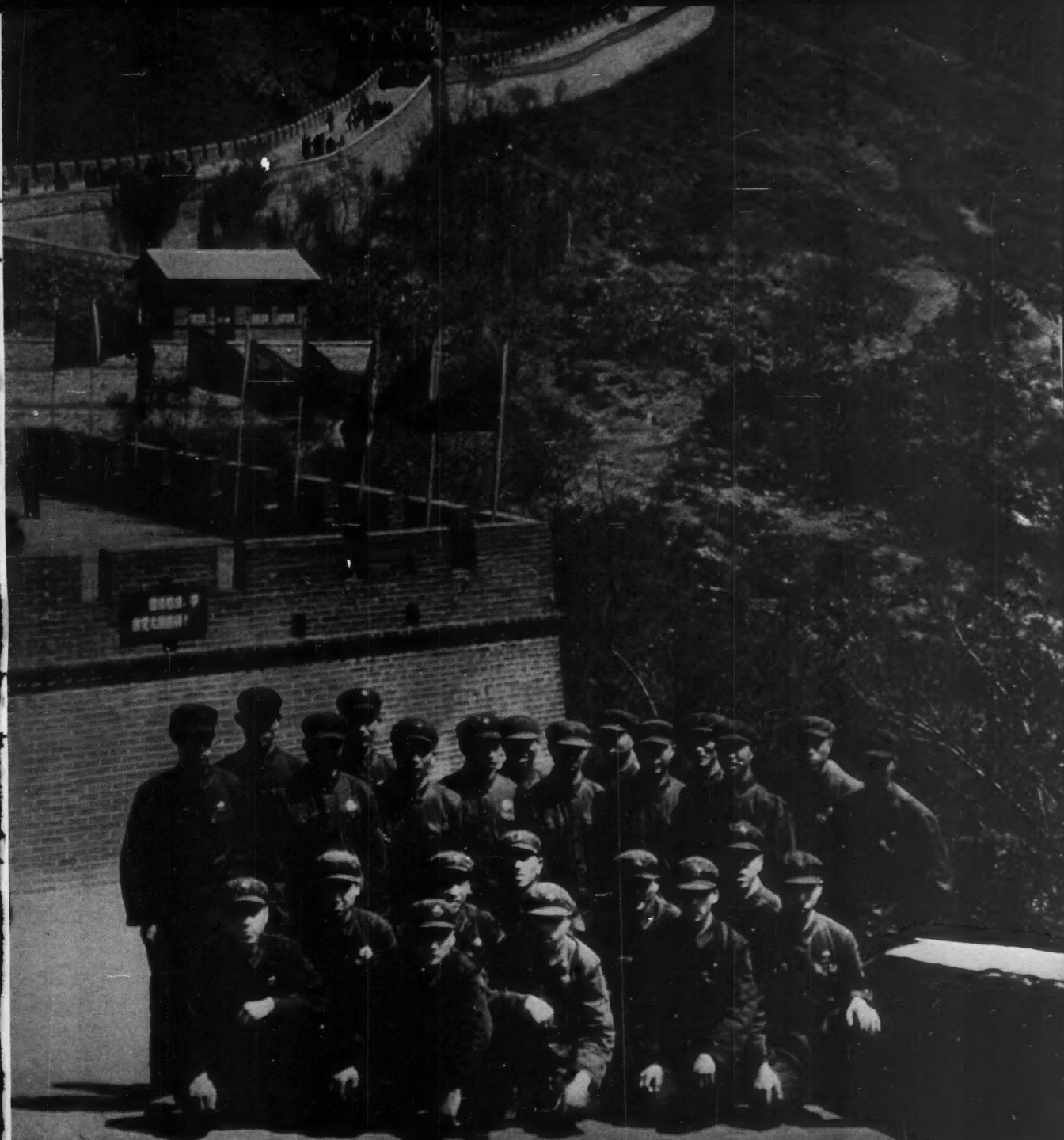
The business outlook for the two primary plug-compatible mainframe (PCM) vendors, for example, finds another market niche poised for rapid revenue growth. Both Amdahl Corp. and National Advanced Systems Corp. (NAS) have good reasons to be optimistic about their futures. Because of competitive pricing pressure, however, the two vendors' earnings will fall short of their revenue increases.

Amdahl, the original PCM vendor, has come a long way since June 1975, the date of the first customer shipment of the world's first IBM-compatible mainframe, the 470 V/6. As its 10th year ended Dec. 31, the company reported revenue of \$862 million. When the curtain drops at the end of this year, Amdahl may become only the second PCM vendor ever to reach the \$1 billion plateau.

Getting there, however, is only half

See AMDAHL page 117

Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm.



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